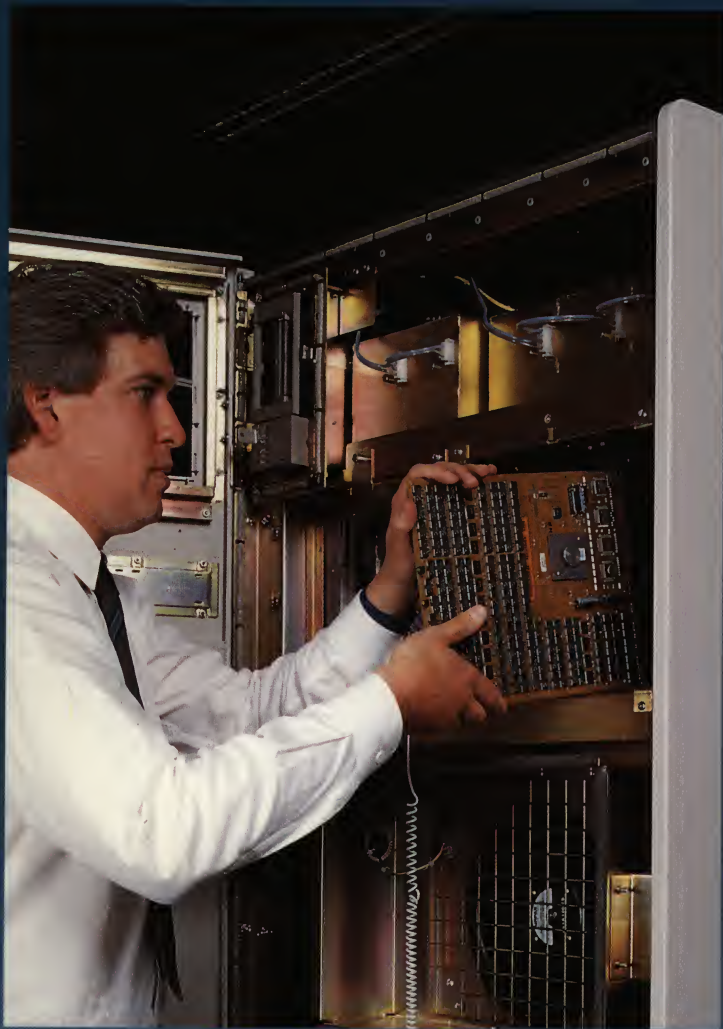


CPU UPGRADE

G U I D E

**Move up to more
power and performance**



Inside . . .

- Capacity planning – the key issues
- Upgrade or migration – which is right for your application?
- New systems
- Performance comparisons

A
U
T
U
M
N
1
9
8
9

service en ondersteuning

NIEUWE CPU UPGRADE CATALOGUS

Deze catalogus geeft een overzicht van de diverse upgrade-mogelijkheden van PDP-11, MicroVAX en VAX-computersystemen die Digital haar relaties momenteel kan bieden. Behalve de upgrade - mogelijkheden gaat de catalogus ook in op capaciteitsplanning en performance management van computersystemen en geeft een overzicht van de verschillende software producten en consultancy services met betrekking tot performance management.

Hoe te bestellen

U kunt uw bestellingen telefonisch of schriftelijk bij DECdirect plaatsen. Indien u bijvoorbeeld niet geheel zeker bent welke upgrade het meest geschikt is voor uw doeleinden of wanneer u vragen heeft over de juiste configuratie-samenstelling, dan kan DECdirect u in verbinding brengen met de juiste specialisten. Indien u niet vertrouwd bent met bepaalde producten of meer algemeen advies wilt ten aanzien van deze producten, dan kunt u contact opnemen met de Customer Assistance Desk (030-832100) of uw verkoopcontactpersoon. Vermeld bij elke bestelling uw account-nummer bij Digital en het nummer van uw kortingsovereenkomst, plus:

- ▶ het in de catalogus vermelde, volledige artikelnummer
- ▶ de naam en het telefoonnummer van uw contactpersoon

U kunt natuurlijk ook op een andere manier bestellen:

Per Post:

U kunt uw bestelling ongefrankeerd in een open enveloppe sturen naar: DECdirect. Antwoordnummer 1736, 3500 VC Utrecht.

Zoals u ziet is deze catalogus overtaald. Gezien het technische karakter van de informatie, hebben wij de vrijheid genomen u deze CPU Upgrade Guide in de originele taal toe te zenden.

Hierdoor is het mogelijk dat u een consultancy service als VAX/VMS Optimalisatie Analyse (VOA) in deze catalogus terugvindt als VAX/VMS Performance and Capacity Service (VPCS).

Per Telex:
40370 DEC NL
Per Telefax:
030-888094



Belangrijke Telefoonnummers:

DECdirect 030-832883
Voor bestellingen van de Digital producten in deze catalogus.
Klantenservice 06-0224466 (gratis)
Bij eventuele vragen over geplaatste en/of geleverde orders bij DECdirect.
Customer Services Desk 030-832888
Voor het melden van storingen aan uw hardware of software.
Customer Assistance Desk 030-832100
Voor algemene informatie en documentatie.
Educational Services 03402-89444
Voor informatie over cursusinhouden en cursusdata.
Digital Nederland 030-839111.

Verkoopvoorwaarden

1. Op alle bestellingen van produkten uit deze catalogus zijn onze Algemene Voorwaarden van toepassing, zoals gedeponeerd bij de KvK te Utrecht onder nummer 535, voorzover daarvan hieronder niet wordt afgeweken.
2. Bij orderbedragen van minder dan f 500,00 is geen enkele ortingsregeling van toepassing.
3. Voor orders beneden de f 150,00 worden f 25,00 administratiekosten in rekening gebracht.
4. Reclames binnen 8 dagen na faktuurdatum onder vermelding van de in de rechterbovenhoek aangegeven referentienummers.
5. Alvorens om welke reden dan ook, goederen naar Digital Equipment bv te retourneren, gelieve u eerst contact op te nemen met DECdirect, opdat u de juiste retourdocumenten i.v.m. omruil of creditering kunnen worden toegezonden. Retourzendingen zonder deze documenten worden niet geaccepteerd.
6. Indien koper een order voor artikelen uit deze catalogus minder dan 30 dagen voor aflevering geheel of gedeeltelijk annuleert, zal Koper annuleringskosten verschuldigd zijn ter waarde van 5% van de in de prijslijst vermelde brutoprijs der betreffende produkten, met een minimumbedrag van f 150,00 per annulering. Orders kunnen na aflevering niet geannuleerd worden.
7. De prijzen van de in deze catalogus opgenomen produkten zijn exclusief installatiekosten.

Complete van toepassing zijnde Algemene Voorwaarden zijn op aanvraag verkrijgbaar.

WHAT'S AHEAD

	Page		Page
Planning for System Growth	3	- For PDP-11 and VAX-11/730 Owners	21
Growth Alternatives for Every Computing Style	7	- For MicroVAX I and MicroPDP-11 Owners	21-22
		The MicroVAX 3100	23
VAX MIGRATION		PDP-11 MIGRATION	
What You Need to Know: Background Facts and Figures	8-10	The PDP-11 and VAX Families - Complementary Systems for Greater Choice	24
Multiple Growth Paths for VAX-11/750/ 730/780/785 Owners	10-11	PDP-11 Migration - Which Route Should You Take?	25
Multiple Growth Paths for VAX 8700 and VAX 8800 Owners	12	Migrate to the MicroPDP-11/83, 11/73 or 11/53/53-PLUS	26
Upgrade to the VAX 8550 and VAX 8350	13	MicroPDP-11/73 and MicroPDP-11/83 Upgrades	27-28
The VAX 6000 Series	14-15	Migrate to the PDP-11/84	28-29
The VAX 8800 Series	16	Multiple Growth Paths for PDP-11/04/24/34/44 Owners	30
MicroVAX MIGRATION		Multiple Growth Paths for PDP-11/70 and 11/84 Owners	31
What You Need to Know: Background Facts and Figures	17-18		
MicroVAX 3300 and MicroVAX 3400	18-19	Relative performance chart for all VAX, MicroVAX and PDP-11 systems	32-33
MicroVAX 3800 and MicroVAX 3900	19-20		
Migrating to the MicroVAX II	20		

PLANNING FOR SYSTEM GROWTH

When you purchased your computer system, it met your needs - no doubt with room to spare. However, it usually happens that when the system is seen to be operating successfully, users' expectations rise: more and more tasks are identified for transfer to the system and more people want access to it. Over time, the computer is expected to take on more work and yet to perform more quickly!

The major challenge facing anyone responsible for managing a computer system is how to maintain (or increase) system performance while at the same time enhancing the

Here, we look at some of the issues involved in capacity planning and the factors you should consider in order to keep your system in step with the growth of your organisation.

Successfully managing a computer system requires continual, careful analysis, planning and monitoring. Rushing to upgrade or migrate as a means of buying yourself out of trouble will probably provide only a short-term fix, with no long-term resolution of the underlying problem.

You need to start by stepping back and clarifying two areas:

- How objectives are supported by information system performance

For example, if customer service enquiries are a major component of your company's product or service, then making prompt response times a priority can provide an important way to measure system performance.

A tuned system has configuration, workload and performance in a balance that maximises your system's usefulness. To establish what a tuned system means in your business environment is important because it gives you a base

PLANNING FOR SYSTEM GROWTH

For VAX users, Digital offers a variety of tools and services to help you tune your system:

- ▶ VAX Monitor
- ▶ VAX Performance Advisor (VPA)
- ▶ VAX Software Performance Monitor (SPM)
- ▶ VAX/VMS Performance and Capacity Services (VPCS)
- ▶ DECsupport

Your local Digital sales office can supply details of all these products.

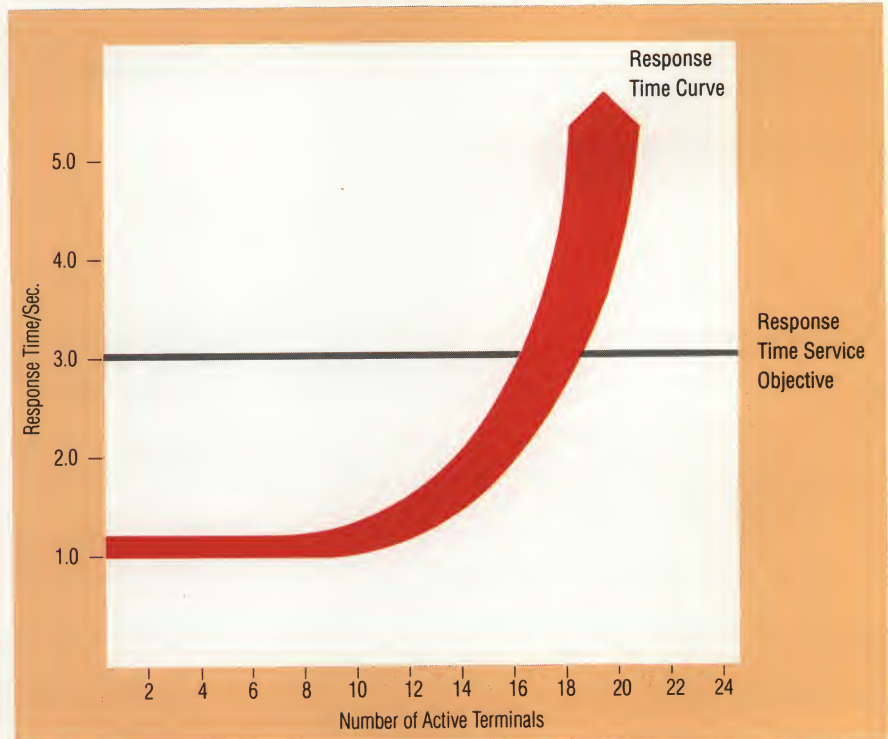
Establishing a service-level objective

A service-level objective is a computing performance standard that you set to measure and manage a defined business objective.

For example, it can be the number of transactions per second, or the amount of time required to process a specific number of payroll records, interactive keyboard response, and so on.

The number represents your best estimate of a minimum level of performance. To fall below it will immediately and negatively affect your business goals or user productivity.

In your organisation, service-level objectives may be part of an original system purchase specification. If applications have continued to change and/or more users have to be supported, taking the time to set new service-level objectives for your system will be very important to your business.



This chart plots the system response time of a customer support system and illustrates the impact of adding additional users. Notice how quickly the response-time curve accelerates after the optimum number of customer support specialists has been exceeded. In this example, the service-level objective is a three-

second response time to retrieve account data and make appropriate entries.

The business must make changes to the system configuration to support the increase in operators. If it does not, it will not meet the service-level objective, and this will begin to affect business goals.

How is a service-level objective set and monitored?

You need to identify which activities are key to the organisation and then define service-level objectives.

The following questions may help you in this process:

- ▶ Do you have computer transactions that assist customer contact, (e.g. order status enquiry, pricing information, product information, invoicing information)?
- ▶ Which applications support the 'mainstream' of your business?

Which ones would hurt you most if they were out of action?

- ▶ Which applications or transactions support the operations where you have the most of your financial investment? What information system supports the most capital-intensive part of your business?
- ▶ Which department contains the most scarce or most expensive human resources? Which key applications and transactions

PLANNING FOR SYSTEM GROWTH

- ▶ Do you have any current 'friction' areas in the business? Is a section less profitable than you would like? Which applications or transactions support that area?
- ▶ Can you describe the 'bottlenecks' in your process flow? Which key computer transactions support these areas?
- ▶ If you could improve your computer service levels, what part of the business would be likely to benefit the most?

If you can identify ONE transaction in each critical area, you are off to a good start. Try to prioritise the different service-level objectives.

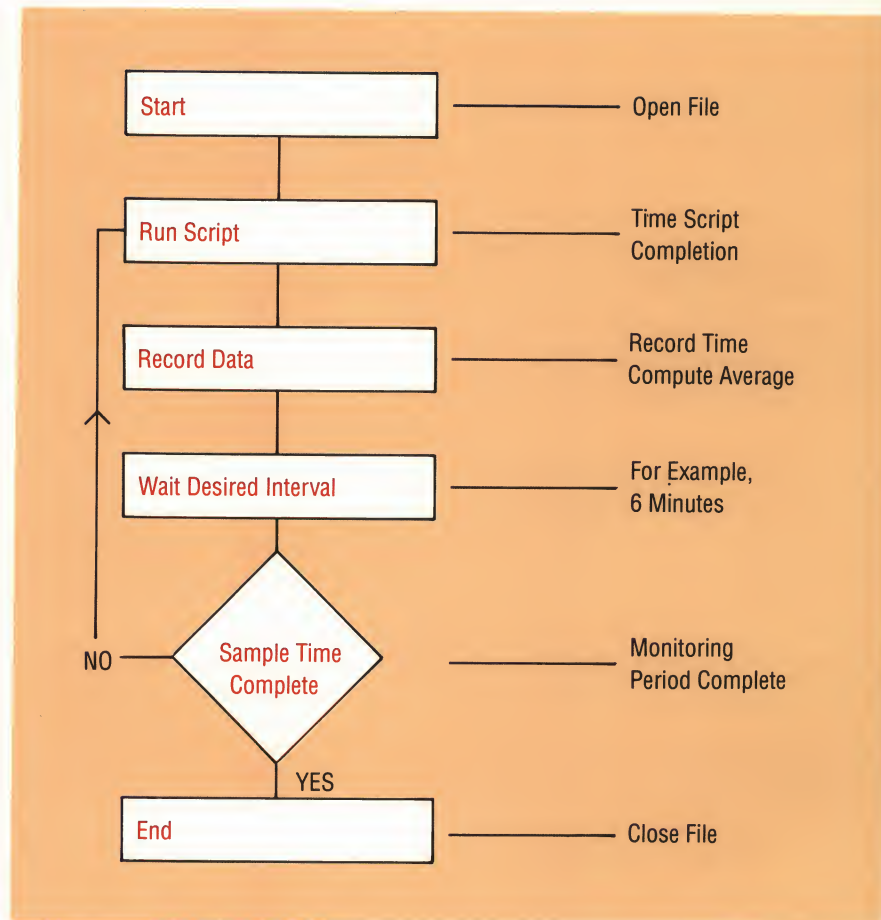
You then need to create a 'customised monitoring procedure' that lets you run a service-level objective benchmark program at regular intervals and to chart the results.

The customised monitoring procedure is a simple way to run your service-level objective benchmark program at regular intervals, as shown in the diagram. The alternative is to have to remember to run the program manually at the predetermined times.

By using a customised monitoring procedure, you can run your service-level objective benchmark program at regular intervals and have the data ready for your analysis.

You need to carry out this procedure over a period of time. Too short a monitoring period could lead you into making false assumptions based on artificial or unusual peaks in activity.

It helps to have a means of determining performance trends over time. Identifying trends strengthens your planning process and provides a method to communicate business



The following charts depict performance trends from three different viewpoints: a peak processing period within a day, a daily trend of performance during an entire month, and a view of a month's performance in the context of a year.

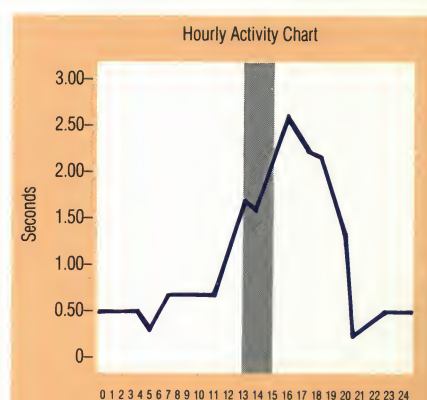
Summarising performance trends allows you to notice the effect changing business requirements have

on your success in meeting service-level objectives.

Proper time-phased trending buys you time to make adjustments. It provides you with business reasons to convince higher management of required changes or investments. It allows you to better anticipate pending increases in workload and resource demand.

This chart summarises the average runtime of the service-level objective benchmark program over a 24-hour period in July. The peak processing period occurs between 1300 and 1500 hours, when the runtime is between 2.0 and 2.5 seconds.

Daily performance charts can help you to identify system usage problems during a typical working day.



PLANNING FOR SYSTEM GROWTH

This chart depicts the performance of the service-level objective benchmark program during the month of July. The values plotted for each day represent the average service-level objective benchmark runtime during the peak processing period. The values form a trend line that enables you to see the system's performance relative to your service-level objective.

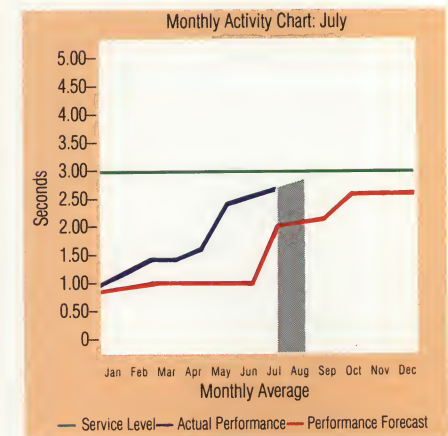
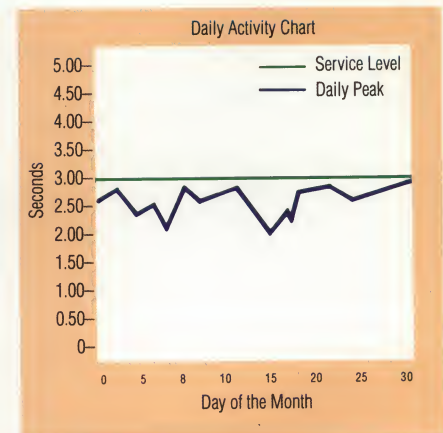
This chart depicts the performance of the service-level objective benchmark program during a calendar year. The values represent an average of the service-level objective benchmark program runtime during the peak processing period each month.

A chart that summarises activity for a year can help you to understand

Monthly performance charts can help you to forecast especially heavy periods of system demand. For example, the gradual increase in response time indicated on this chart may reflect an increase in the number of transactions processed after billing dates on the first and fifteenth day of the month.

unusual increases in demand for system resources. For example, the increase in response time during the month of April may have been caused by the early introduction of CAD/CAM engineering applications.

The shaded area represents the month depicted in the previous chart.



SUMMARY

Planning for performance and productivity lets you meet the changing needs of your organisation's user community.

It addresses three system components: performance, the time required to meet a user's need; workload, the type and volume of processing that your system supports; configuration, the hardware that you use to support performance and workload.

Use this process to begin actively managing your computing resources. Establish a tuned system. Set a service-level objective. Monitor and chart performance trends to meet that objective.

When the time comes for you to decide that your organisation's needs

can be met only by upgrading your system or migrating to a new one, you will find Digital offers a wealth of alternatives from which to choose the one that suits your organisation's objectives.

Further, if you need assistance in planning or implementing a system migration, Digital can provide it. Digital's software professionals consult on an extensive range of services to simplify conversion and migration-related activities.

GROWTH ALTERNATIVES FOR EVERY COMPUTING STYLE

When your corporate goal is business growth, increased efficiency and user productivity, Digital offers information system resources to ensure your success.

Since its inception, Digital has specialised in providing compatible growth alternatives that meet present business needs, protect your installed investment, and ensure future expansion.

Why CPU migration?

The need to support additional users and applications can exceed your current CPU capacity. New organisational structures may necessitate new, more effective communication links or data sharing requirements. The size, price and performance of new technology make

upgrades to current systems an attractive and viable choice.

Regardless of your changing corporate computing demands, the key to successful growth lies in understanding the range of alternatives available to you.

Digital's wide range of alternatives

Digital offers you a wealth of growth possibilities. You can upgrade your CPU to newer, higher performance technology. Or, you can retain your current CPU, incorporating it in a powerful network of high-performance systems in distributed or centralised configurations.

Whatever style of computing meets your organisational needs, Digital offers a modular growth path for today and tomorrow.

More reasons to migrate

There's never been a better time to migrate...

- ▶ CPU migration programmes may allow you to receive credit for your current CPU when you trade it towards the purchase of new timeshare systems.
- ▶ Software allowances can provide 100% credit for all existing layered software product licences towards the purchase of new licences for the upgraded CPU.
- ▶ Peripheral migration programmes may provide cost-saving incentives when you upgrade selected VAX-compatible peripherals.



VAX MIGRATION

DIGITAL'S STYLE OF COMPUTING MAKES GROWING SIMPLER

Hardware compatibility across the VAX family. The VAX family of general-purpose computers ensures compatibility from the desktop to the data centre. VAX architecture creates a consistent computing environment that adapts easily to your needs now and in the future.

Software compatibility protects your training, growth, and migration investment. Software compatibility ensures easy, straightforward growth while protecting your investment in system applications. As your business grows and changes, you can add VAX processors and still use the software you have been using.

Performance alternatives to meet every computing need. Members of the VAX family range from workstations and servers to MicroVAX timesharing systems, mid-

range systems, high-end systems, and VAXcluster systems. With Digital's in-cabinet upgrades, you can upgrade system performance on site.

Networking solutions improve communications across a system. Digital's extensive local area and wide area networking solutions can link people and resources throughout your organisation, locally or internationally, into a single network.

Users can share files, directories, and other resources without giving a thought to the topology, size, or geographical distribution of network resources.

Multiple growth paths link the VAX family. The alternatives include - in any combination - performance enhancements for processors, memory, and I/O; additional processors in

multiprocessing configurations; VAXcluster systems; and local or wide area networks.

All system enhancements are installed by Digital personnel and have a full year's warranty.

A new alternative is offloading some applications to a VAXstation or MicroVAX system to leave your primary system free for other applications.

Clustering provides high data availability in high I/O environments. VAXcluster technology is Digital's unique alternative to the traditional mainframe.

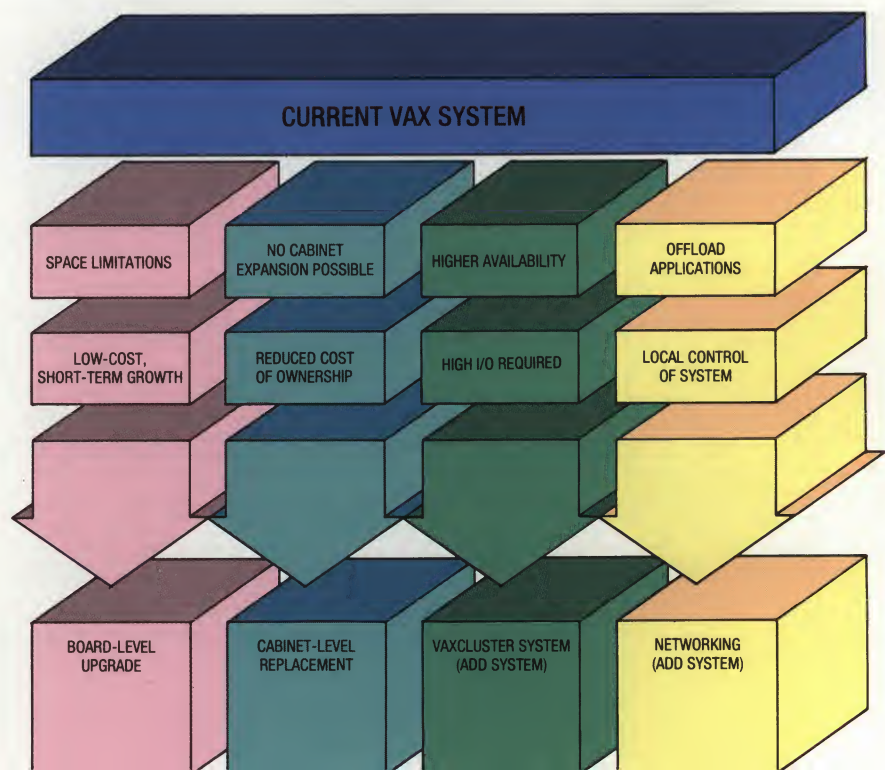
From two to 42 VAX systems and intelligent storage controllers, and the storage devices connected to them can function as one powerful system. Users can access the latest data from anywhere in the cluster.

MULTIPLE GROWTH PATHS FOR VAX SYSTEMS

STARTING HERE ...

BASED ON YOUR REQUIREMENTS
AND NEEDS ...

SELECT YOUR GROWTH
ALTERNATIVE



VAX MIGRATION

Consider your growth alternatives

Board level upgrades are available for expanding a CPU in a stand-alone or cluster environment. If your system is nearing its capacity, its performance may be decreasing. Consider an upgrade to increase capacity for present applications and to provide room for growth. Digital provides a wide range of CPU upgrade products for VAX systems.

Cabinet level replacements are available for systems in a standalone, networked, or

clustered environment. When your VAX system needs to be replaced, you have a choice of Digital systems that includes the latest technological advances. New systems provide more power and are less costly to purchase and operate. The VAX/VMS architecture assures a smooth low-cost migration to your new VAX system.

Clustering is available for creating a multiple CPU and shared database environment or for adding a cluster node. VAXclusters offer the most flexible, cost-effective growth path. Clusters can be part of your VAX computing strategy. You

can continue to add incremental capacity without disturbing current users. Clustering is the most popular growth path for VAX users.

Networking is available for creating a computer network or adapting a system to a network. The expanding need for communication continues to gain significance in corporate computing strategies. Accessing databases, communication across the world, and connecting desks in a powerful local network are all accomplished with Digital's Network Architecture.

Key features of the VAX computer family - at a glance

VAX 8250/8350:

Entry-level VAXBI Systems

- ▶ Departmental solution
- ▶ Performance from 1.2 to 2.3 times that of a VAX-11/780 system
- ▶ Large system capability at entry-level prices
- ▶ Full VAXcluster support, large disk capacity
- ▶ Symmetric multiprocessing support (VAX 8350) under VMS Version 5.0
- ▶ Flexible, well-balanced CPU performance, I/O capacity and memory
- ▶ System growth through in-cabinet upgrades or VAXcluster systems
- ▶ Highest performance per square foot in the VAX computer family
- ▶ Performance from 6 times up to 22 times that of a VAX-11/780 system
- ▶ System growth through in-cabinet upgrades or VAXcluster systems
- ▶ Maximum single-stream performance: maximum number of supported users
- ▶ Supports high-performance computational as well as general timesharing environments

VAX 6000 SERIES:

Widest Range of Single-cabinet Systems

- ▶ Departmental or organisation-wide solution
- ▶ Performance from 2.8 to 36 times that of a VAX-11/780 system
- ▶ Price/performance leader for multistream applications
- ▶ VAX 8550: Single-stream Performance in a Compact Package
- ▶ Departmental or organisation-wide solution
- ▶ Price/performance leader for large single-stream applications
- ▶ Compact, cost-effective solution where expansion is not a requirement

VAX 8800 SERIES:

High-performance VAX Computing

- ▶ Organisation-wide, data centre or high-performance computing solution

VAXcluster SERIES:

High Availability and High Data Rates

- ▶ Organisation-wide, data centre and critical applications
- ▶ Highest performance and growth paths
- ▶ High availability for maximum productivity
- ▶ High I/O rates for large database applications

VAX MIGRATION

VAX Migration - the benefits to your organisation

- ▶ Preserve current investment.
- ▶ Add capacity modularly, as you need it.
- ▶ Match the style of computing to user and workload requirements.
- ▶ Reduce the cost of ownership with newer, more easily maintainable technology.
- ▶ Increase system availability and reliability.
- ▶ Take advantage of application compatibility across the entire system family
- ▶ Get higher performance in a more compact packaging.
- ▶ Move with an architecture (VAX/VMS) that will be adaptable well into the 1990s.

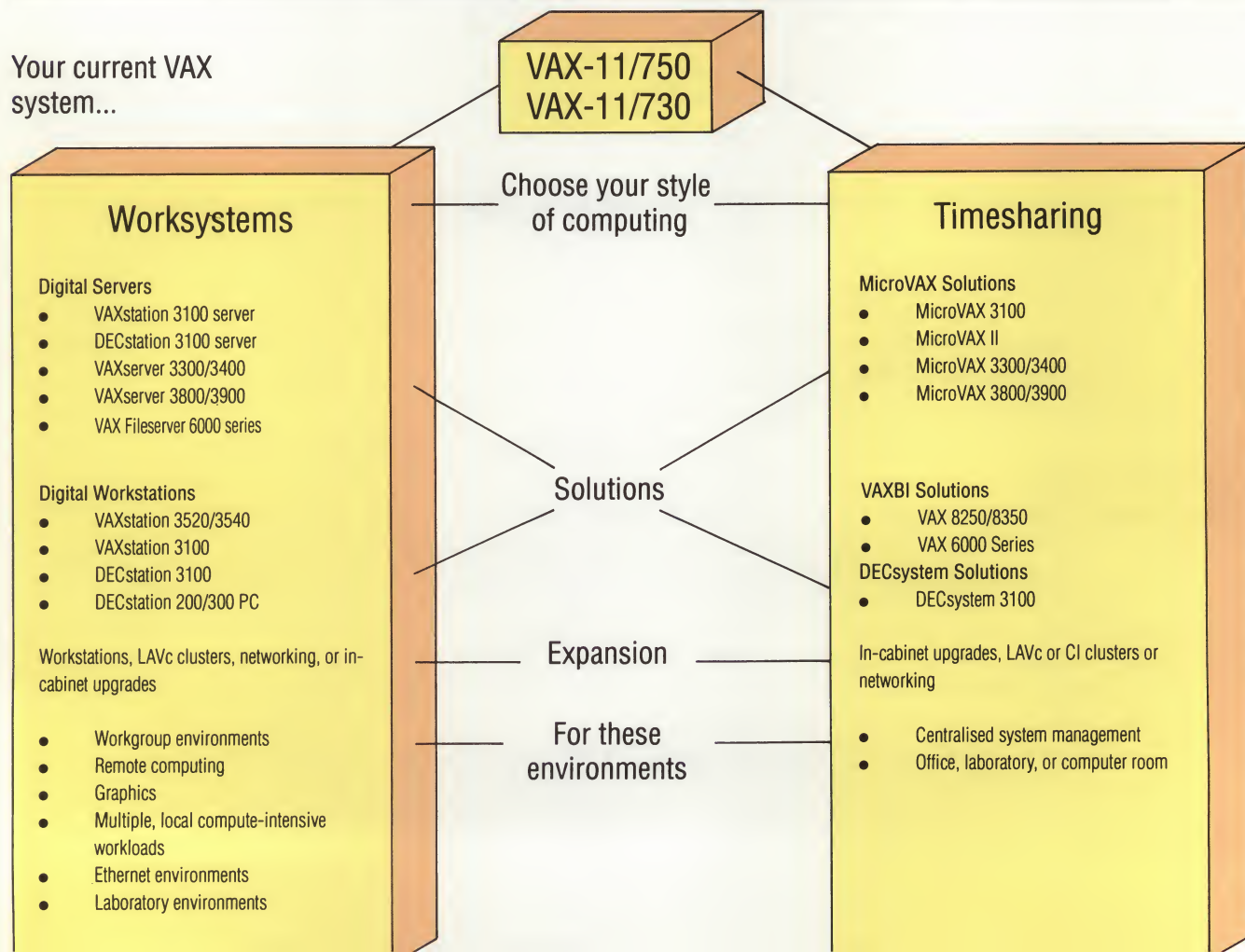
MULTIPLE GROWTH PATHS FOR VAX-11/750/730 AND VAX-11/780/785 OWNERS

What is your computing system designed to accomplish? Is your system designed to support an administrative function or is it

dedicated to a user workgroup? Is it better to boost the capacity of your computer room or is it better to boost desktop computing capacity?

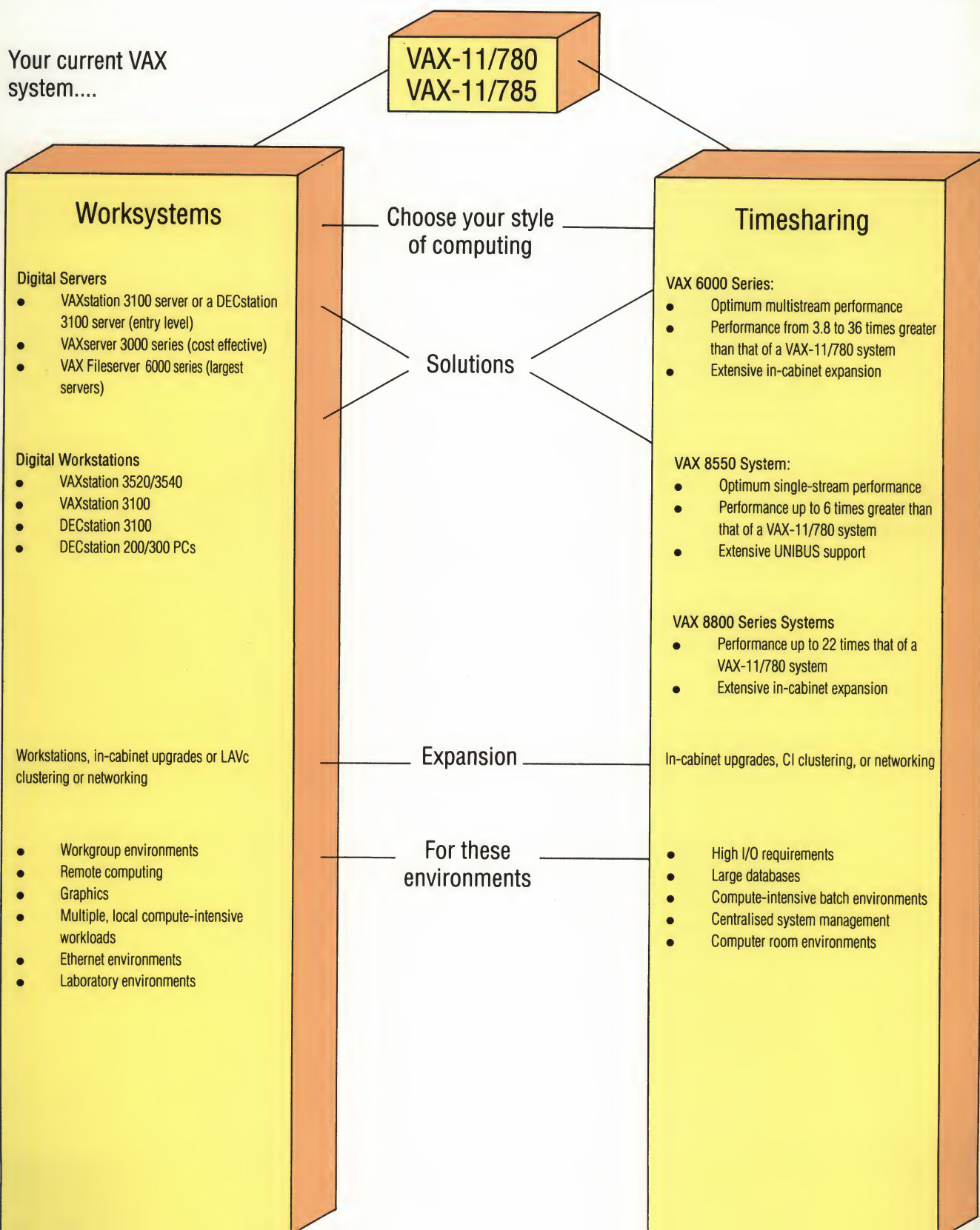
Your answer determines your choice of a centralised or distributed system.

FOR VAX-11/750/730 OWNERS



VAX MIGRATION

FOR VAX-11/780/785 OWNERS



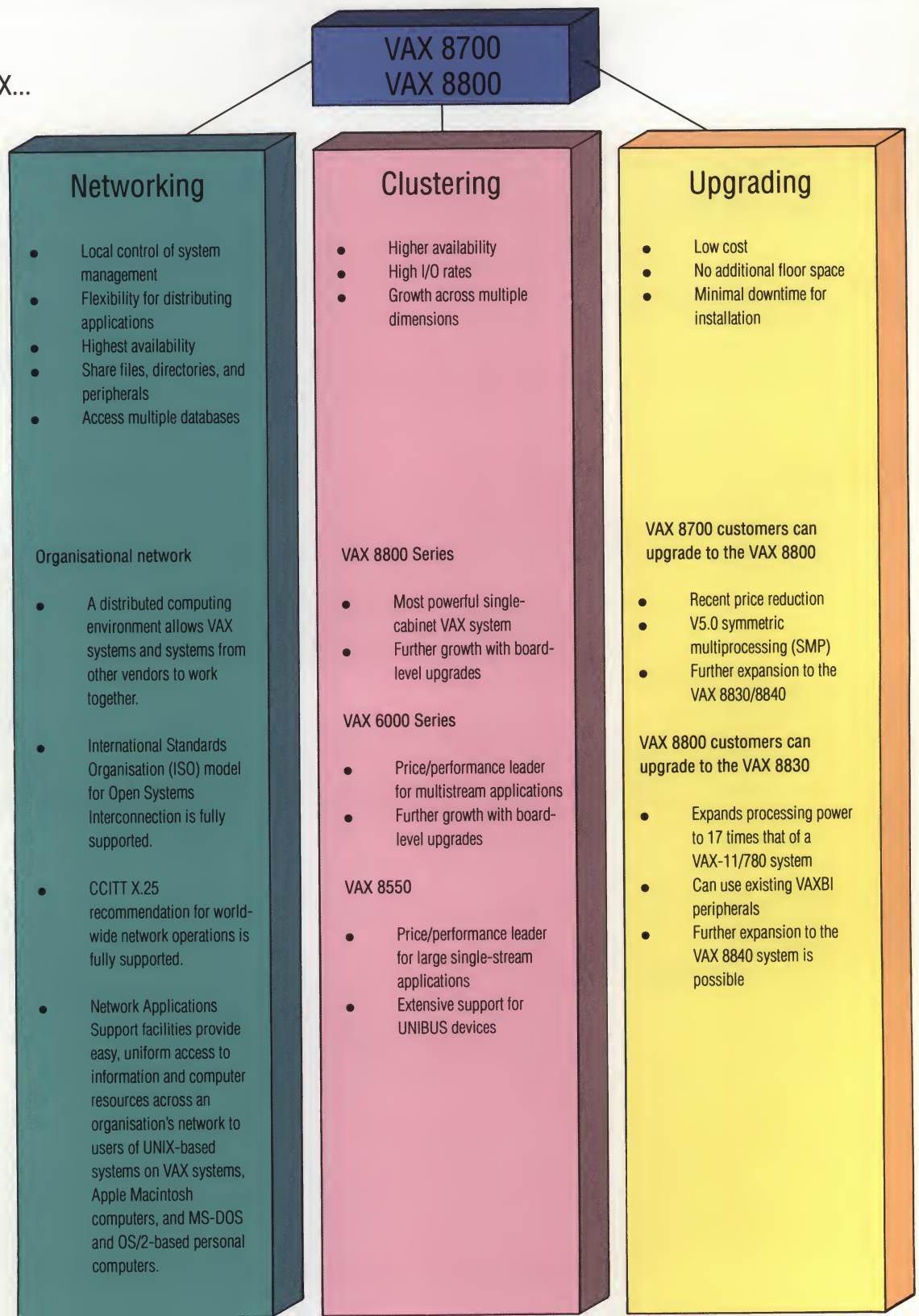
VAX MIGRATION

MULTIPLE GROWTH PATHS FOR VAX 8700 AND VAX 8800 SYSTEM OWNERS

Your current VAX...

Choose your
growth path...

with these
alternatives...



VAX MIGRATION

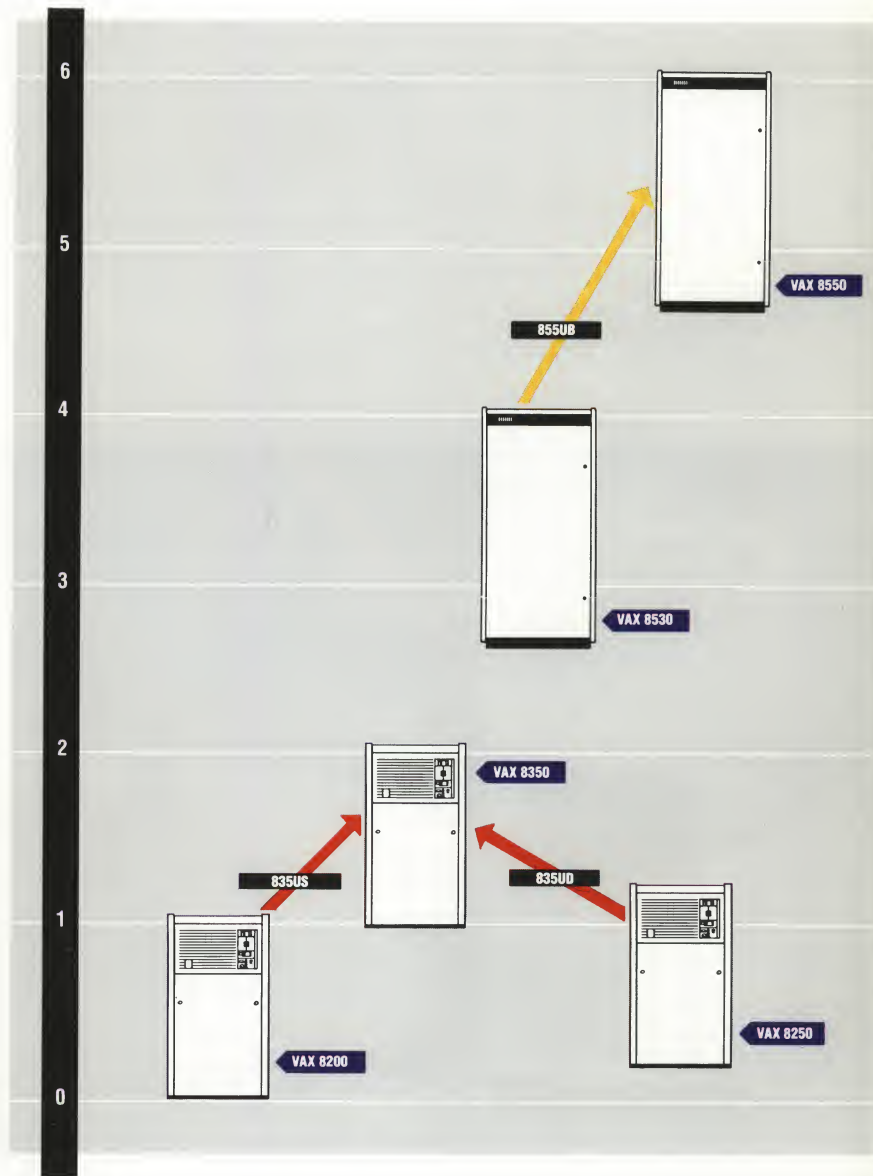
VAX 8350 UPGRADE

Grow your system easily and efficiently with VAX 8350 and VAX 8800 packages. When you upgrade your VAX 8200/8250 system to a VAX 8350, you add four times the memory in just one slot in the backplane with 16MB memory boards. This frees up even more room for VAXBI expansion options.

Version 5.0 and symmetric VAX/VMS multiprocessing boost the overall system throughput of multistreaming workloads on VAX 8350 and VAX 8800 systems. SMP lets multiple multistreaming jobs finish faster because the VMS operating system balances the workload automatically. Best of all, it is transparent to system users.

VAX 8550 UPGRADE

Improve your current investment's performance/square foot ratio as you grow from an 8530 to an 8550 system. For a VAX 8530 system with new applications or additional users, the 8550 Performance Enhancement Package is the answer. It can boost performance up to 50% - a big boost for a small footprint space-saver!



Keep your system in balance as you grow

Each Performance Enhancement Package is a complete solution. It includes hardware, operating system software licence upgrade, FREE on-site configuration audit, FREE hardware installation and a one-year on-site hardware warranty.

Performance Enhancement Packages can improve total system performance up to 130%.

They give you flexibility to use your system with a variety of applications in a variety of environments. All this builds a secure foundation for your growth in the future.

VAX MIGRATION

THE VAX 6000 SERIES

High-end performance in a mid-range package

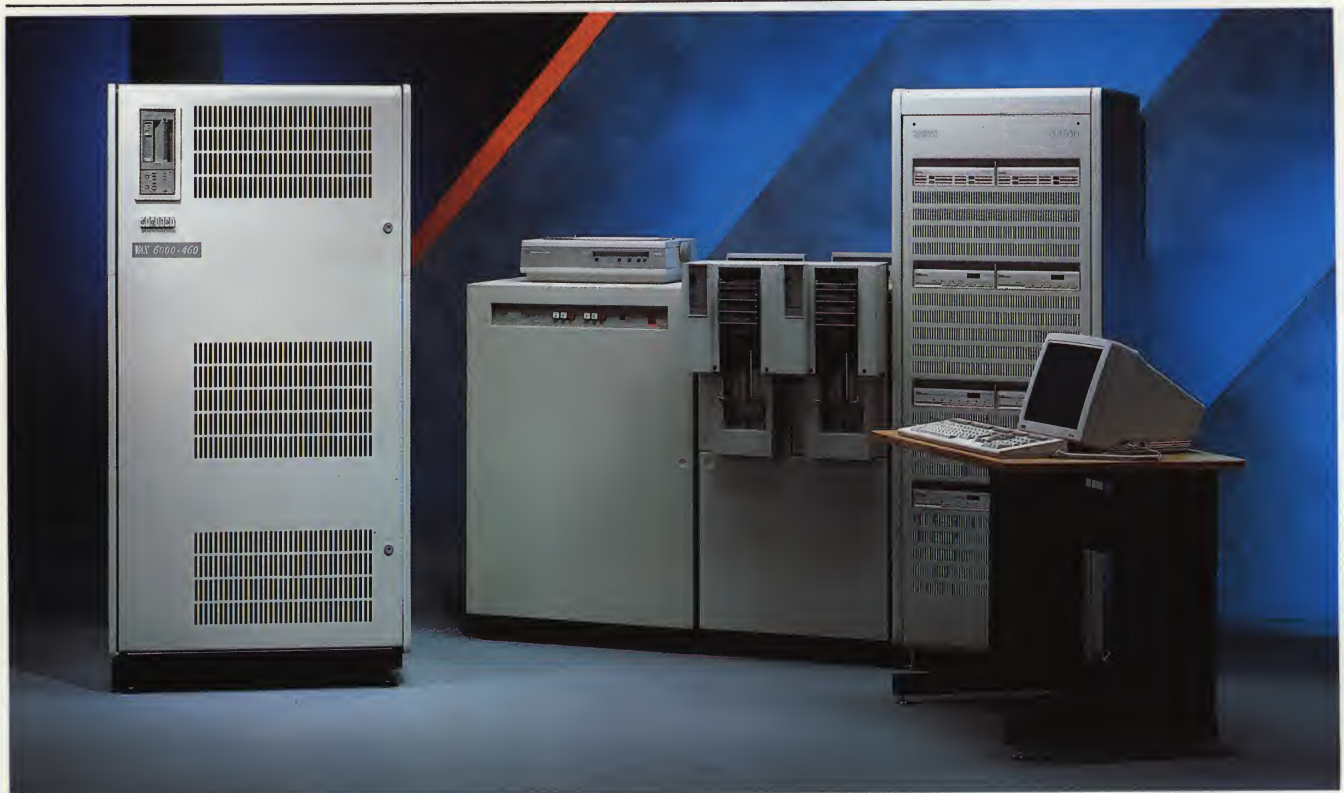
The VAX 6000 series sets a new standard for mid-range systems in three areas; price/performance, cost of ownership, and system growth capabilities.

Each member of the VAX 6000 series features high-end system

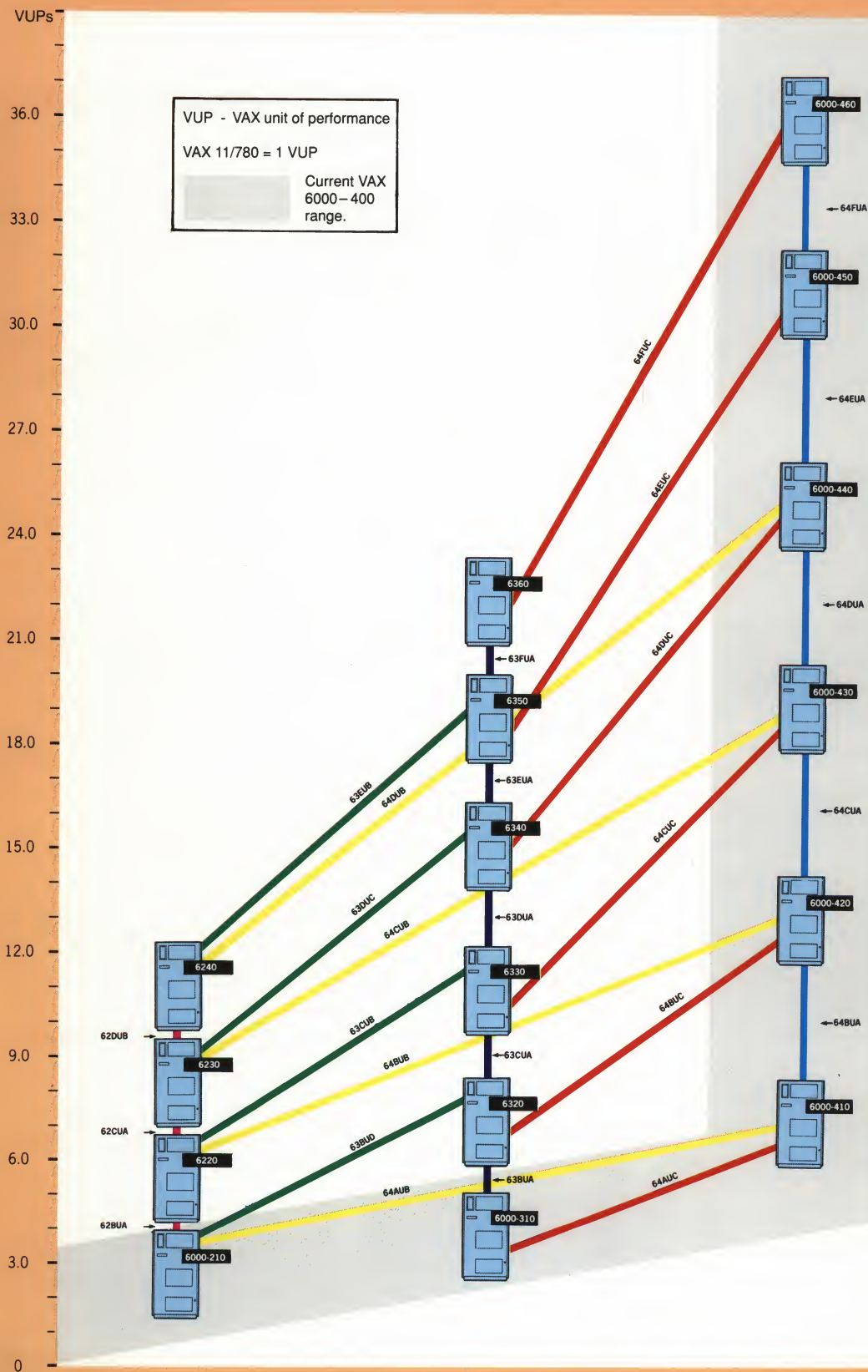
capabilities in a compact package.

The VAX 6000 series spans the range from 2.8 up to 36 times the performance of the VAX-11/780. The broad range of the series lets you choose a system to meet your needs.

Easy-to-install upgrade packages allow you to increase system capacity and performance as your needs change and grow.



VAX MIGRATION



VAX MIGRATION

THE VAX 8800 SERIES

The VAX 8800 series expands to meet your high-performance needs

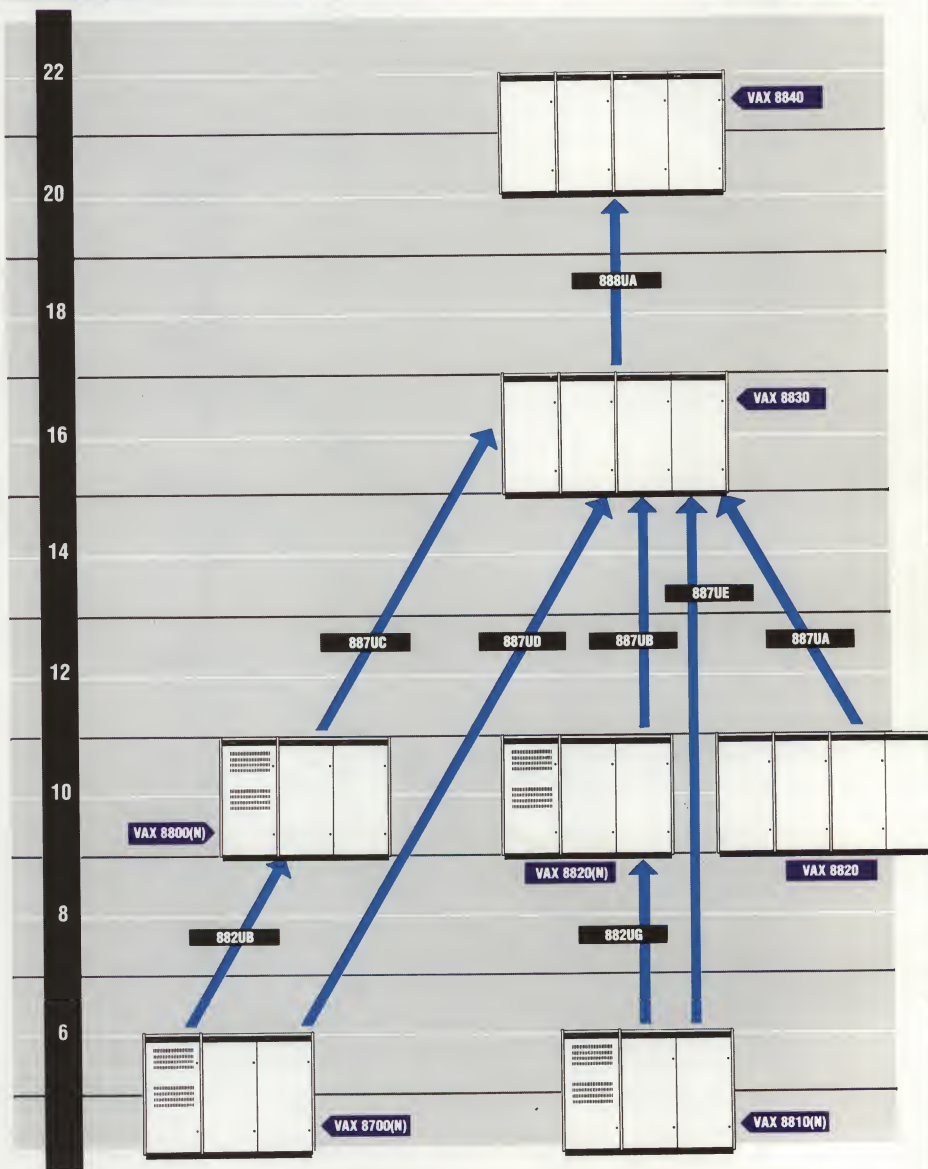
The VAX 8800 series extends single-system performance to up to 22 times that of a VAX-11/780 system. The powerful systems in the series can be configured with up to four processors.

The VAX 8820, VAX 8830, and VAX 8840 are tightly-coupled multiprocessors. In addition to their high price/performance values, they maximise the power and speed advantages provided by symmetric multiprocessing in the VMS V5.0 operating system.

The VAX 8842 system combines the benefits of both symmetric multiprocessing and VAXcluster capabilities. It is designed for time-sharing environments with large numbers of interactive users. The VAX 8842 provides high data availability in a single system for interactive applications.

Digital offers multiple growth paths for VAX 8700/8800 customers that satisfy a wide range of economic and performance requirements.

VAX 8700/8800 customers can choose upgrading, clustering or networking as their growth alternatives. The VAX 8800 series systems and Version 5.0 of VMS with symmetric multiprocessing together offer significant performance increases and improved long-term growth possibilities.



MicroVAX MIGRATION

THE MicroVAX SYSTEM OFFERINGS ARE GROWING TO MEET YOUR NEEDS

The time to enter the world of 32-bit computing has never been better. MicroVAX system choices range from the compact MicroVAX 3100 to the MicroVAX 3800 and 3900 systems and their VAXserver counterparts.

As leaders in system technology, the MicroVAX systems first brought 32-bit VAX technology into the office environment with the MicroVAX II. Now, taking advantage of the most recent advances in technology, the MicroVAX 3000 systems extend system performance to the departmental level.

Compatible with MicroPDP-11 systems. Migration to MicroVAX systems may be easier than you think. Most of your Q-bus peripherals can be used on the MicroVAX, thus preserving your current investment.

Uses standard VAX operating systems and applications. MicroVAX systems run your choice of VMS or ULTRIX-32 operating systems. VMS is Digital's multiuser, timesharing operating system. ULTRIX makes the most of VAX features in a UNIX environment.

Users can continue to enjoy many compatible software features, such as DCL and RMS. Choose from

thousands of existing applications for VMS or ULTRIX, including ALL-IN-1. And for real-time operating environments, choose VAXELN.

Takes the computer out of the computer room. You no longer need to maintain an expensive computer room for departmental computing needs. Any MicroVAX system can easily be used as a group system, located right in your department.

The small packaging of these systems is deceptive. They all deliver true VAX performance with the same powerful multiuser, general-purpose functionality found in much larger systems.

Multiple MicroVAX systems can be clustered. With Digital's Local Area VAXcluster capability, you can connect multiple MicroVAX systems and VAXstations within a cluster environment.

LAVc Phase II clustering software allows the combination and addition of CI-based clusters into one cluster system. This provides access to more computer resources, more availability to workgroups, volume shadowing, and no single point of failure. In addition, full DECnet capabilities make it easy to communicate with systems outside the cluster.

Migration Paths to the MicroVAX Family

If your current system is:

MicroVAX I
MicroPDP-11

VAXstation I,II

PDP-11 UNIBUS
Multiple PDP-11s
VAX-11/730, VAX-11/750
MicroVAX II
MicroVAX 2000

Upgrade to:

MicroVAX II
MicroVAX 3100, II,
3300/3400/3800/3900
VAXstation 3300/3400/
3800/3900/GPX,LAVc
MicroVAX LAVc
MicroVAX LAVc
MicroVAX LAVc
LAVc
MicroVAX 3100

Selecting a MicroVAX system

MicroVAX systems comparisons	MicroVAX 2000	MicroVAX II	MicroVAX 3300	MicroVAX 3400	MicroVAX 3500	MicroVAX 3600	MicroVAX 3800	MicroVAX 3900
CPU	ZMOS	ZMOS	CMOS	CMOS	CMOS	CMOS	CMOS	CMOS
VUP*	.9	.9	2.4	2.4	2.7	2.7	3.8	3.8
Minimum Memory	4MB	5MB	12MB	12MB	16MB	32MB	16MB	32MB
Maximum Memory	14MB	16MB	52MB	52MB	64MB	64MB	64MB	64MB
Maximum Disk Capacity	318MB	2.8GB	1.5GB	2.4GB	2.4GB	9.1GB	2.4GB	9.7GB
I/O Bus	N/A	Q22	Q22/DSSI	Q22/DSSI	Q22/DSSI	Q22	Q22/DSSI	Q22
Backup	RX33, TK50	TK50, TU81+ TSV05, TK70	TK70	TK70	TK70, TU81+* TSV05**	TK70, TU81+* TSV05**	TK70, TU81+* TSV05**	TK70, TU81+*, TSV05**

*VUP = VAX Units of Performance (estimated range). Relative CPU Performance as compared to the VAX-11/780 system, which has a base line rating of 1.0. Performance is application dependent.

MicroVAX MIGRATION

MicroVAX/VAXBI features chart

MicroVAX

- ▶ Single CPU systems
- ▶ Disk capacity up to 9.7GB
- ▶ Maximum memory is 64MB
- ▶ CPU performance ranges from 0.9 times to 3.8 times that of a VAX-11/780 system
- ▶ Suitable for office environments (except 3900)
- ▶ Distributes functions among workgroups or small departments
- ▶ VAXcluster support
- ▶ Q-bus I/O throughput up to 3.3MB/s

VAXBI

- ▶ Single/multiple CPU systems
- ▶ Disk capacity up to 40GB
- ▶ Maximum memory is 512MB
- ▶ CPU performance ranges from 1.2 times to 36 times that of a VAX-11/780 system
- ▶ For use in computer room
- ▶ Centralised computing for large number of users
- ▶ VAXcluster support
- ▶ VAXBI I/O throughput up to 60MB/s (with multiple BI channels)



MicroVAX 3300 AND MicroVAX 3400

Setting the precedent for price/performance

The MicroVAX 3300 and 3400 systems are proving an exciting extension to the MicroVAX family of products. They offer twice the price/performance of the popular MicroVAX II and build on the CMOS technology of the MicroVAX 3500 and 3600 systems. Added to that are Q-bus compatibility and innovative packaging.

Along with increased processor performance, these systems offer advanced storage capabilities. The new RF30 and RF71 integrated storage elements (ISE) with their embedded intelligent controllers are key to this. The result is performance and functionality that approach those of high-end storage subsystems but at low-end subsystem prices.

The MicroVAX 3300 and 3400 are software-compatible with other VAX family computers and can run VMS or ULTRIX-32 operating system software. There is a wide choice of Digital built-in or external applications

and Q-bus options.

The MicroVAX 3300 and 3400 standard systems come with 12MB of ECC memory, an embedded Ethernet controller, and either one or two RF30 or RF71 ISEs.

Building on that base you can then add memory, storage, and Q-bus options incrementally as you need them.

The new BA215 enclosure for the MicroVAX 3300 has a six-slot Q-bus backplane, one power supply, a mass-storage cavity that holds two RF series Integrated Storage Elements and a tape drive.

The BA213 enclosure for the MicroVAX 3400 has a twelve-slot Q-bus backplane, two power supplies, and can accommodate three full or half-height storage devices. A tape drive can be accommodated in a fourth storage cavity.

If you need more storage capacity, you can add to either system an expander box with space for three ISEs, providing up to 1.2GB of additional storage.

Each MicroVAX 3300 and 3400

comes with 4MB of onboard ECC memory and can have up to three 16MB memory modules for a maximum of 52MB of memory.

In contrast to conventional disk drives, the embedded intelligent controllers of the RF30 and RF71 allow multiple ISEs to work in parallel.

This means that data throughput and bandwidth increase linearly with the number of ISEs used. With the ISEs, a proper balance is maintained between disk capacity and I/O capability as you add up to six integrated storage elements per Digital Storage Systems Interconnect (DSSI).

Along with increased throughput and bandwidth, the MicroVAX 3300 and 3400 systems provide more system and data availability than previous MicroVAX systems.

Through the use of elegant dual-host configurations combined with VAXcluster software, you can give your business the advantage of higher availability.

MicroVAX MIGRATION

A dual-host configuration consists of two systems whose ISEs are linked by the Digital Storage Systems Interconnect cable - actually an external bus. Through that link, each system can access all ISEs on the bus.



MicroVAX 3300 and MicroVAX 3400 highlights

- ▶ Two and one half times the CPU performance, and three times the data throughput and bandwidth of the MicroVAX II.
- ▶ High-end storage functionality and performance with Digital's half-height, 5.25-inch 150MB disk - RF30 and full-height, 5.25-inch 400MB RF71 integrated storage elements.
- ▶ Higher availability through dual-hosting.
- ▶ The VAX systems with the lowest cost per OLTP (on-line transaction processing) transaction/second.
- ▶ 4MB of ECC memory embedded on the CPU module.
- ▶ Integral Ethernet controller and ISE storage adapter.
- ▶ New compact enclosure for easier setup and maintenance.
- ▶ Thousands of compatible VAX applications and Q-bus options.

MicroVAX 3800 AND MicroVAX 3900

The most powerful VAX supermicros yet

With the advent of the MicroVAX 3800 and 3900 systems, Digital offers compact MicroVAX systems delivering over four times the processor power and up to twice the memory of the MicroVAX II.

The MicroVAX 3800 and 3900 level of price/performance makes departmental computing more cost effective than ever. The MicroVAX 3800 and 3900 can be used as stand-alone systems or in a distributed network.

The high performance of these systems allows you to gain the benefits of a high level of computerisation that previously could not be cost justified.

Up to 64MB of ECC memory provides four times the capacity of the MicroVAX II. This provides the data integrity and speed needed for your application. Large applications can reside entirely in the memory of a MicroVAX 3900.

Each MicroVAX 3800 or 3900 system provides twelve backplane slots

to accommodate the CPU, up to four memory boards and your choice of options.

Such choices range from high-speed laser printers to asynchronous and synchronous communication devices to D/A and A/D converters and parallel digital I/O devices.

Then as your needs grow you can add new systems for separate, demanding applications that require high performance.

The configurations available on the MicroVAX 3800/3900 enable each system to accommodate future growth

and compatibility.

With the extra capacity of Digital's RA series disks as standard equipment on the MicroVAX 3800 and 3900, you will discover significant I/O throughput improvements over previous systems.

These MicroVAX systems can make ideal Local Area VAXcluster boot nodes or cluster managers. The MicroVAX is space-efficient and installation is simple. In a footprint of just 4.75 square feet you can support up to 2.4GB of disk storage.

Continued . . .



MicroVAX MIGRATION

MicroVAX 3800 highlights

- ▶ Compact office packaging
- ▶ Enclosure accommodates up to two 280MB disks (RA70) and one 296MB cartridge tape (TK70)
- ▶ Maximum disk capacity of 560MB
- ▶ Supports up to 64MB of ECC memory

MicroVAX 3900 highlights

- ▶ Computer room system
- ▶ 40-inch cabinet with room for two RA90 disk drives and one 296MB cartridge tape (TK70)
- ▶ Maximum disk capacity of 9.7GB
- ▶ Supports up to 64MB of ECC memory

Board upgrades from the MicroVAX/VAXserver 3500 and 3600 and the 3800 and 3900 are now available. These upgrades will provide up to 40% more computing power for your existing MicroVAX/VAXserver 3500 and 3600 systems.

Part No.	Description
655XR-AA	MicroVAX 3500/3600 upgrade to MicroVAX 3800/3900
655XR-BA	VAXserver 3500/3600 upgrade to VAXserver 3800/3900

Note: ONLY 16MB memory boards are supported on the MicroVAX/VAXserver 3800 and 3900.

MIGRATING TO THE MicroVAX II

VAX architecture in a supermicro package

The MicroVAX II brought VAX performance out of the computer room and into the working environment - where it belongs. With VAX compatibility, big system performance, a small footprint and network/cluster capability, the MicroVAX II puts practical computing power into users' hands.

Choose from many different configurations of MicroVAX II to meet your specific needs. Your

MicroVAX II goes to work the day it arrives. Installation is simple, and the office packaging eliminates the need for special site requirements.

The MicroVAX II system supports versions of all three popular VAX operating systems: VMS for general purpose, multiuser computing, ULTRIX-32 for UNIX environments, and VAXELN for real-time applications.

Programming languages can be added easily. Choose from ADA, APL, BASIC, C, COBOL, DIBOL, FORTRAN, Pascal, RPG II and

others. Digital offers an extensive range of languages as well as programmer productivity and information management tools.

Finally, Digital has shipped over 100,000 MicroVAX systems worldwide, supporting a wide range of applications, and with the price/performance leadership that has become the industry standard.

Read the information which follows and then call your Digital sales representative to choose the best MicroVAX II system for your organisation.

MicroVAX II highlights

- ▶ High-performance 32-bit architecture . . . a real VAX system on a chip
- ▶ Three superior system software options: VMS, VAXELN, and ULTRIX-32
- ▶ Up to 16MB of high-speed, tightly-coupled memory
- ▶ Industry-leading, extensive, flexible networking capabilities
- ▶ Leadership floating-point performance
- ▶ Full VAX memory management
- ▶ Large address space: 4GB
- ▶ Software compatibility with all VAX processors
- ▶ Thousands of available application software packages
- ▶ Attractive business computer packaging, with lots of room for growth
- ▶ Complete selection of mass storage devices, including cartridge tapes, and a 5.25 or 14-inch high-performance disk.

MicroVAX MIGRATION

THE ULTIMATE MicroVAX II - FOR PDP-11 AND VAX-11/730 OWNERS

PDP-11 and VAX-11/730 system users can migrate to the higher performance MicroVAX II Configurations 5 or 6. These Q-bus systems are KDA50-based versions of our popular MicroVAX II family and offer increased expansion capabilities. Now, you can order the RA82 disk to be included in your system.

The MicroVAX II system offers increased price/performance. Depending on the application, relative CPU performance can be up to twice that of the PDP-11/44, up to three times that of the VAX-11/730, and up to four times that of the PDP-11/24 and PDP-11/34 systems. These MicroVAX II packages offer 90% of VAX-11/780 system performance in an H9642 cabinet.

The MicroVAX II is compatible with other VAX systems. For PDP-11 users who network their systems with larger VAX systems, the ease of file exchange using the MicroVAX II greatly improves the ability to share information.

And PDP-11 owners who upgrade to the MicroVAX II are able to choose from the ever-expanding list of VAX applications. If you are a PDP-11 or VAX-11/730 system user, you may have been limited by memory capacity. MicroVAX II systems come with up to 16MB of memory to provide you with more than enough expansion for your layered applications.

The MicroVAX II system is economical to maintain. Comparing similarly configured systems, MicroVAX II service charges are approximately 10% lower than those

to 25% lower than those for the 11/34 and 11/44 systems. The MicroVAX II is packaged for expansion flexibility. The H9642 cabinet enclosure houses two BA23 chassis that include two 8-slot backplanes for a total of 14 available backplane slots. There is also space for four 5.25-inch storage devices and two 14-inch RA storage

devices. The KDA50 can optionally support two more RA disks in a second cabinet.

The new MicroVAX II Configuration 6 system can offer 2.8GB storage capacity. This standard system package features the RA82 622MB Winchester disk drive and the TK70 tape drive.

MIGRATING TO THE MicroVAX II - FOR MicroVAX I AND MicroPDP-11 OWNERS

Upgrade to higher performance now. With one simple in-cabinet upgrade, MicroVAX I or MicroPDP-11 owners can get the full power of the MicroVAX II.

All upgrade kits are fully warranted (hardware and software) for one year, including complete on-site module exchange and installation by Digital personnel.

The MicroVAX II provides up to 90% of the performance of the VAX-11/780 in an under-the-desk system. All hardware, operating system software and service are included for a smooth migration. We remove your old CPU, memory, and disk controller, and reconfigure your system.

Continued . . .



MicroVAX MIGRATION



The MicroVAX II offers for MicroVAX I owners:

- ▶ TK50 tape drive and controller included in standard package
- ▶ Software compatibility
- ▶ Use of current BA23 cabinetry
- ▶ Investment protection for Q-bus peripherals
- ▶ Three times the performance of the MicroVAX I

The MicroVAX II offers for MicroPDP-11 owners:

- ▶ Operating system licence (VMS or ULTRIX), media and documentation included
- ▶ Optional package with TK50 included
- ▶ Low-cost upgrade to VAX/VMS technology
- ▶ Twice the performance of the MicroPDP-11/73
- ▶ Five times the performance of MicroPDP-11/23

Major Options Supported on MicroVAX II Systems:

- | | |
|---------------|-------------------|
| - DEQNA | - TQK50/TK50 |
| - DELQA | - TQK70/TK70 |
| - DZQ11 | - TU81E |
| - DHQ11 | - RA81/RA82/RA60 |
| - DHV11 | - TSV05 |
| - DPV11 | - RQDX2/RX50/RD52 |
| - DZV11 | - RQDX2/RX50/RD52 |
| - DMV11 | - RD53/RD54 |
| - DRV11-WA | - RQDXE |
| - MS630-BB/CA | - LPV11/LP25/LP26 |

Notes:

1. **MicroPDP-11 Owners:**
A TK50 tape drive and controller are necessary to run user diagnostics and to load software (which is distributed on a TK50 tape). If you do not have the TK50 available, it is advised that you purchase the package with the TK50 tape drive included. Please ensure that you have an RQDX3 disk controller included in your minimum configuration if you do not own one.
2. Return of old CPU modules to Digital is mandatory for this upgrade. The return value of these parts is already calculated in the complete upgrade price.
3. The -H/-J versions may also be appropriate for VAXstation I system owners who want to upgrade to VAXstation II systems.

Part No.	Description
630XR-CB	MicroPDP-11 to MVII, VMS Lic/H-kit, TK50, 240V
630XR-CC	MicroPDP-11 to MVII, VMS Lic/H-kit, 120/240V
630XR-DB	MicroPDP-11 to MVII, ULTRIX Lic/H-kit, TK50, 240V
630XR-DC	MicroPDP-11 to MVII, ULTRIX Lic/H-kit, 120/240V
630XR-HB	MicroVAX I to MVII, VMS Lic/H-kit, TK50, 240V
630XR-JB	MicroVAX I to MVII, ULTRIX Lic/H-KIT, TK50, 240V

MicroVAX II Upgrade Kit contents:

Quad-sized MicroVAX II processor board, FPU
 9MB Memory
 1MB on CPU board - 8MB
 MS630-CA board
 RQDX3 MSCP Disk Controller (-H/J versions only)
 TK50-DA 95MB Cartridge Tape
 Desktop Variation (Not on -CC/DC versions)

TQK50-AB Tape Controller (not on -CC/DC versions)
 Complete documentation set
 - User's Guide
 - Owner's Manual
 - Installation Guide
 User Diagnostics on TK50 Tape
 Operating System Licences Plus Key for 1-8 users - VMS or ULTRIX-32
 Software documentation and media on TK50 Tape

MicroVAX II Medallion
 Digital integration of hardware (mandatory)
 - De-installation
 - Installation of new upgrade kit
 - Reconfiguration of typical system
 - Reformatting of disk (if necessary)
 - Hardware test with diagnostics
 Allowance for return of old CPU modules to Digital

MicroVAX MIGRATION

THE NEW MicroVAX 3100

32-bit computing at personal computer prices

The MicroVAX 3100 offers an entry into multiuser VAX computing for around the cost of a personal computer. Whether you need a distributed system for general-purpose computing or a dedicated, stand-alone system, the MicroVAX 3100 is the right solution at the right price.

The MicroVAX 3100 represents the ideal migration route for current users of the MicroVAX 2000, MicroVAX II, or PDP-11 systems. Compared with the MicroVAX 2000, it provides over 2.5 times the performance, more than four times the disk storage and twice the memory. Please see the table for more details.

The MicroVAX 3100 is designed for easy installation. It is available in two enclosures, each compact enough to fit on a shelf or desktop. The VMS and DECnet software are pre-loaded, so you can start using your system as soon as it is unpacked.

The MicroVAX 3100 grows with your application. The standard systems have 4MB of memory on the CPU board and this can be expanded incrementally, while retaining your current memory modules, up to a maximum memory of 32MB.

Disk capacity can also be increased. The Model 10 enclosure has space for up to three storage devices: the Model 20 has space for up to five. Both enclosures also have an external bus that allows up to three external disks (RZ55 332MB disks) to be added.

The system comes with four asynchronous lines as standard, expandable to 12 asynchronous lines, and one synchronous line with an

terminal lines can be added using the DEC server 200, 300 or 500.

The networking features of the MicroVAX 3100 let you coordinate your business activities. You can build both local area networks (LANs) and Wide Area Networks (WANs). Every system is ready to connect into a Digital DECnet network, with both thick and ThinWire Ethernet connectors being standard.

MicroVAX 3100 highlights

- ▶ Lowest priced entry-level VAX system.
- ▶ Over 2.5 times the CPU performance of the MicroVAX 2000 system.
- ▶ Choice of system packaging for maximum economy or expansion.
- ▶ Incremental RAM upgrades preserve memory investment while enabling expansion to 32MB.
- ▶ Factory-loaded VMS and DECnet software saves time.
- ▶ External bus allows connections to external storage devices.

Comparison of MicroVAX 2000 and MicroVAX 3100 systems

	MicroVAX 2000	MicroVAX 3100
Relative CPU Performance (VAX-11/780 = 1.0)	0.9	2.4
Cache	No	On chip
On board memory	Yes/2MB	Yes/4MB
Ethernet	Operational	Standard
Maximum memory	14MB	32MB
Asynchronous ports	4 standard 12 maximum	4 standard 12 maximum
Tape backup	95MB	95MB
Disk storage type	RDxx (ST506)	RZxx (SCSI)
Maximum disk capacity	318MB	1.5GB



PDP-11 MIGRATION

THE PDP-11 AND VAX FAMILIES: COMPLEMENTARY SYSTEMS FOR GREATER CHOICE

Today's PDP-11 and VAX systems are the result of years of development and technological refinement. The PDP-11 architecture spans one of the broadest arrays of compatible hardware and software systems ever offered. The VAX architecture is a continuation of that computing tradition into the world of 32-bit systems.

Bus compatibility for easier migration. PDP-11 systems are available in UNIBUS and Q-bus configurations - the same I/O subsystems used on MicroVAX II and larger traditional VAX systems. Because it is easy to build interfaces to these buses, the PDP-11 family continues to be a good long-term investment. And when it comes time to migrate to other PDP-11 or VAX systems, many of your UNIBUS and Q-bus peripherals can move with you.

Software compatibility within the PDP-11 family. With PDP-11 systems, you get a wide range of application software - a complete set of operating systems, data management and program development tools, and a full range of Digital's industry-standard communication capabilities.

Now, new and long-time PDP-11 system users have more migration alternatives than ever before! You can move to a faster and more efficient PDP-11 or VAX system and be assured that whatever crucial first steps you take today will lead to a viable migration path for the future expansion of your computing environment.

Is the time right for a change?
From the entry-level MicroPDP-11/53

MicroPDP-11/83 and PDP-11/84 systems or even into the 32-bit arena with the entry-level VAX systems - MicroVAX II or MicroVAX 3000 series, Digital can provide you with the system you need, when you need it.

Many exciting PDP-11 upgrade options. If you are

considering migration to a newer or more powerful PDP-11 system look through the next few pages. The VAX upgrade options found on previous pages are also practical alternatives for migration from your existing PDP-11 CPU.

Key benefits of moving up within the PDP family or to a VAX system are:

- ▶ Increased CPU performance (more horsepower for existing jobs)
- ▶ Increased memory capacity (from 4MB on PDP-11 systems to 6-32MB on MicroVAX systems)
- ▶ Higher user productivity
- ▶ More cost-effective operation
- ▶ Improved system reliability (fewer failures and less downtime)
- ▶ Ability to add more users
- ▶ Migration to newer state-of-the-art architectures
- ▶ Support for newer peripherals
- ▶ Increased expansion capability

Your PDP-11 migration alternatives

Once you have analysed your business and computational growth requirements, you need to decide what specific product will meet your needs. The diagram shows your possible growth paths. "Existing" CPU is your

current installed system. "New" CPU is the planned upgrade or new system.

The migration solution can range from a module level upgrade, to a CPU box or cabinet replacement, or to the acquisition of a full new system with peripherals, depending upon your growth requirements.

Which route should you take?

PDP-11 systems continue to excel in real-time applications, while VAX systems are sure winners in processing large programs for a large number of users.

For the PDP-11 customer, the basic alternatives are:

1. Upgrade your current CPU (PDP to PDP system).
2. Move to a new system (PDP to VAX).
3. Use both a PDP and VAX system in a co-existence environment.

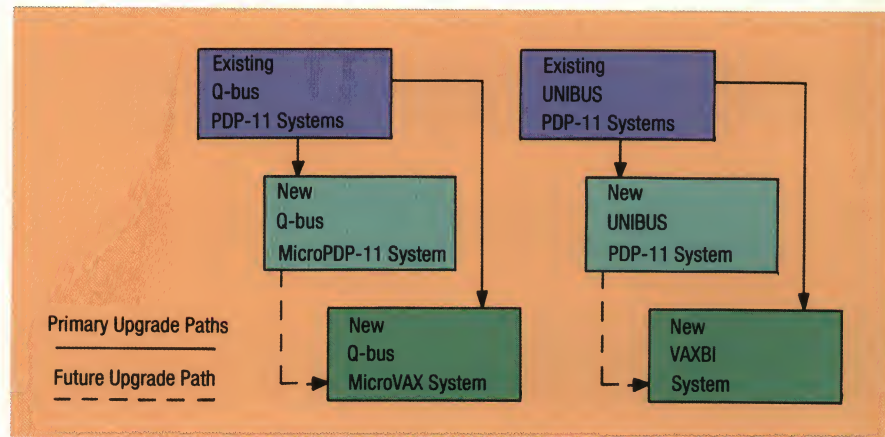
OR

Add an additional system (the distributed or decentralised approach).

PDP-11 MIGRATION

Some things to consider:

- ▶ Additions of new applications
- ▶ Networking requirements
- ▶ Software conversion or upgrade
- ▶ The amount of growth desired
- ▶ Short-term and long-term requirements
- ▶ The number of total and concurrent users planned
- ▶ Peripheral compatibility
- ▶ Cost of ownership over the next few years



Alternative 1. PDP-11 to PDP-11

Upgrading to another PDP-11 system may be the easiest migration alternative. You can:

- ▶ Maximise your current hardware and software investment.
- ▶ Maintain peripheral compatibility.
- ▶ Reduce your cost-of-ownership.
- ▶ Realise improved system performance.
- ▶ Minimise retraining costs.

A new PDP-11 system can provide increased performance, and will often pay for itself through reduced costs for electrical power and maintenance.

If your goal is to stay in the PDP-11 family, you can choose from MicroPDP-11/53/53-PLUS, MicroPDP-11/73, MicroPDP-11/83 and PDP-11/84 systems which are fully compatible with all of the latest PDP-11 operating systems.

Alternative 2. PDP-11 to VAX

The VAX family offers unlimited opportunities for future growth! The choice to migrate to a VAX system is the right one for those PDP-11 users who need or want:

- ▶ To add new software applications
- ▶ High systems and data availability (clustering)

- ▶ The richness of the VMS operating system
- ▶ Long-term growth potential
- ▶ Ability to handle a large number of users and large applications
- ▶ To take advantage of new VMS layered software products

Depending on the application, relative CPU performance of a MicroVAX (II or 3300/3400/3800/3900) replacement system can provide from:

2-6 times the performance of a PDP-11/44 or MicroPDP-11/73 system

or

4-12 times the performance of a MicroPDP-11/73 or a PDP-11/24 system

Alternative 3. PDP-11 to PDP-11 and VAX

If you believe that a VAX system is part of your long-range plans, but you are not ready to migrate out of the PDP-11 family at the moment, this alternative offers you the best of both worlds - the advantages of co-existence of both a PDP-11 and a VAX machine!

Digital's PDP-11 and VAX systems co-exist in the same environment. The following features help to bridge the 16-bit and 32-bit worlds:

- ▶ **Compatible application software** - Many applications are available for both PDP-11 or VAX systems
- ▶ **Data transfer capabilities** - Data collected on a PDP-11 system can be processed on a larger VAX machine.
- ▶ **Similar user interfaces** - Digital Command Language (DCL) provides a standard command interface to Digital's operating systems.
- ▶ **Common networking protocols** - DECnet protocols and Ethernet hardware are common to both PDP-11 and VAX systems.
- ▶ **Time-saving emulators** - Devices such as VAX-11/RSX permit a program written on a PDP-11 to be run on a VAX system.

This co-existence migration allows you to work on your own transition schedule. You can minimise the disruption to your existing operations, while increasing productivity.

PDP-11 MIGRATION

MIGRATE TO THE MicroPDP-11/83, 11/73 OR 11/53/53-PLUS

MicroPDP-11/83 -

The top of the Q-bus PDP-11 systems

The MicroPDP-11/83 is the most powerful 16-bit, Q-bus system. With more storage capacity, greater I/O capability and more room for options, this system can handle an even greater number of concurrent users than the other Q-bus processors. Depending on your application, the MicroPDP-11/83 can serve up to sixty-five concurrent users.

The MicroPDP-11/83 has an 18MHz, J-11 chip set, Private

Memory Interconnect (PMI) memory and a floating-point accelerator.

The PMI architecture provides a high-performance communications path between the CPU, memory and peripherals. Depending upon your application, it can make program execution up to 50% faster!

The MicroPDP-11/83 offers more storage for memory and real-time options than other processors. It can take advantage of Digital's high-

capacity, high-performance disk subsystems, allowing you to expand to more than 1GB of storage.

With the MicroPDP-11/83 system you have ample room to grow. You can choose from a BA23 pedestal or rackmount enclosure with eight option slots, a BA213 ruggedised enclosure with 12 option slots, a BA123 office enclosure with 12 option slots, or an H9642 cabinet enclosure with 16 option slots.

MicroPDP-11/73 -

High-performance for multitasking and real-time environments

This mid-range system is for multitasking and real-time operations. The MicroPDP-11/73 system gives you one-third more computing power than the MicroPDP-11/53 and the MicroPDP-11/53-PLUS systems.

The MicroPDP-11/73 is based on Digital's powerful, 16-bit, Q-bus processor architecture. The 15 MHz,

J-11 chip set is the heart of the CPU, along with an 8KB direct-mapped cache and a console serial line unit.

A range of fixed disks, flexible disks, and cartridge tape drives is available for the MicroPDP-11/73 system.

There is a choice of packaging to fit your computing environment.

Depending on the enclosure you select, the MicroPDP-11/73 system can support up to forty-one users. Choose between the convenient pedestal or rackmount enclosures, a floorstand model with casters, or a 42-inch-high expander cabinet.

MicroPDP-11/53 AND MicroPDP-11/53-PLUS -

The most cost-effective, entry-level PDP-11 systems

With a 15MHz J-11 chip set and onboard memory, the entry-level MicroPDP-11/53 and MicroPDP-11/53-PLUS systems provide the flexibility you need to perform single process control tasks, yet serve your multiuser needs as well.

Digital's most cost-effective PDP-11 systems can save you power, too. With 0.5MB on the MicroPDP-11 and 1.5MB on the

MicroPDP-11/53-PLUS, the onboard memory frees backplane slots and conserves input power.

The availability of half-height storage devices can increase your storage capacity while minimising power requirements.

With the MicroPDP-11/53 and MicroPDP-11/53-PLUS, you can choose the right enclosure for your computing environment. The

MicroPDP-11/53 and MicroPDP-11/53-PLUS models are housed in a compact pedestal enclosure with two serial line units. Or, you can choose the rackmount enclosure for space-saving cabinet integration.

The MicroPDP-11/53-PLUS system provides up to 30% higher performance than the MicroPDP-11/53 system.

PDP-11 MIGRATION

MicroPDP-11 highlights

- ▶ Memory expansion up to 4MB
- ▶ Complete PDP-11 instruction set
- ▶ Support by all current PDP-11 operating systems, high-level languages, development tools, and more than 2,500 third-party application packages
- ▶ Easy integration into distributed processing environments or into Local Area Networks
- ▶ Support by a comprehensive set of mass-storage subsystems
- ▶ Support by DECnet and Ethernet
- ▶ Co-existence with VAX systems in a networked environment
- ▶ Support by the 15MHz or 18MHz J-11 chip set
- ▶ 8KB direct-mapped cache memory for increased transfer rates and processor speed (MicroPDP-11/73 and MicroPDP-11/83 systems)

MicroPDP-11/73 UPGRADE

Digital's high-performance, cost-effective 16-bit Q-bus system

The MicroPDP-11/73 upgrade puts the powers of more disk storage, faster terminal response, increased multiuser capability, and lower cost per terminal in the hands of Q-bus PDP-11 system users.

Based on Digital's J-11 microprocessor chip, the MicroPDP-11/73 offers improved CPU performance - more than two times greater than the MicroPDP-11/23 and 11/23-PLUS and nine times greater than the PDP-11/23-A and PDP-11/03.

With the MicroPDP-11/73 upgrade, you can add more users and memory. It accommodates four to twelve active users with a memory

capacity up to 4MB. And you can use your existing peripherals because most disks, tapes, and data communication interfaces are compatible with the MicroPDP-11/73 Q-bus.

With this easy upgrade of a board or box swap, you can increase the performance of your Q-bus PDP-11 system. The result is lower cost of ownership and consistently higher productivity. The complete solution: the CPU Upgrade Kit includes the J-11 CPU module with one serial line unit, diagnostic software (RX50), documentation, cabling, and on-site installation by Digital.

The MicroPDP-11/73 System Upgrade Kits include:

11/73-UE/UF
KDJ11-BB CPU Module
Cabinet Kit
Diagnostics on RX50
Hardware Documentation
Installation by Digital
Trade-in Credit for Replaced CPU Boards

11/73-UH
KDJ11-BB CPU Module
MSV11-PL 512KB Memory
BA23-A System Box
BA23A-AR Rackmount Kit
RLV12-AP RL Disk Controller
Cabinet Kit
Diagnostics on RL02
Hardware Documentation
Field Service Installation
Trade-in Credit for Replaced CPU Boards

Part No.	Description
11/73-UE	MicroPDP-11/23 to MicroPDP-11/73 Upgrade Kit
11/73-UF	MicroPDP-11/23-PLUS to MicroPDP-11/73 Upgrade Kit
11/73-UH	PDP-11/03 or PDP-11-23-A to MicroPDP-11/73 Upgrade Kit

Notes:

1. Installation of additional hardware is not included in the upgrade price.
2. Return of the old CPU board is mandatory and credit for it has been calculated into the upgrade price.
3. The operating software licences and layered software licences are the same for the original and the new processor; therefore these software licence upgrades are not required.

PDP-11 MIGRATION

MicroPDP-11/83 MODULE UPGRADE

A power boost for Q-bus PDP-11 owners

The top-of-the-line MicroPDP-11/83 system delivers performance and compatibility. PDP-11/23-PLUS, MicroPDP-11/23, and MicroPDP-11/73 owners can get more power for existing or new applications on their PDP-11 systems. The MicroPDP-11/83 delivers up to three times the power of a PDP-11/23 and 1.4 times that of the MicroPDP-11/73 system. Your hardware and software investments are protected, too.

The MicroPDP-11/83 is the

most powerful 16-bit Q-bus system. It fills your requirements for a powerful, multiuser, multitasking 16-bit Q-bus system.

By combining an 18MHz J-11 chip and a companion floating-point accelerator chip set with a new private memory interconnect, the MicroPDP-11/83 system increases throughput and boosts real-time computing power to higher performance levels than any other 16-bit Q-bus system. The Private Memory Interconnect is especially useful for high-speed data transfer between CPU and memory.

With the benefit of newer technology, the MicroPDP-11/83 system will continue to support new options and software versions as they are released.

The MicroPDP-11/83 Upgrade Kits include:

KDJ11-BF CPU Module
Floating-point Accelerator Chip (on CPU Board)
MSV11-JE 2MB PMI Memory Board
KDJ11 User's and Installation Guide
Diagnostics on RX50 (for -UA and -UB)
User Diagnostics on RL02 (for -UC)
MicroPDP-11/83 Medallion
M9047 Grant Card
Cabinet Kit
Hardware
Integration/Installation/De-installation by Digital
Trade-in Credit for Replaced CPU Boards

Part No.	Description
11/83-UA	MicroPDP-11/73 to MicroPDP-11/83 Upgrade
11/83-UB	MicroPDP-11/23 to MicroPDP-11/83 Upgrade
11/83-UC	PDP-11/23-PLUS to MicroPDP-11/83 Upgrade

Notes:

1. Installation of additional hardware is not included in the upgrade price.
2. Return of the old CPU board is mandatory and credit for it has been calculated into the upgrade price.
3. The operating software licences and layered software licences are the same for the original and the new processor; therefore these software licence upgrades are not required.

BA23-CD

The BA23-CD creates a dual BA23 configuration offering additional slots (14 slots) and 5.25-inch storage devices. The dual BA23 combination can be mounted to create a system with space for two RA-series disks.

Part No.	Description
BA23-CD	Micro expander chassis for BA23 box, 240V

MIGRATE TO THE PDP-11/84

For more performance and economy

If you are currently using the PDP-11/04, PDP-11/24, PDP-11/34 or the PDP-11/44 UNIBUS system, consider upgrading to the PDP-11/84 for more performance and savings in space and in maintenance costs. Future expansion capabilities are an additional benefit of upgrading to the PDP-11/84.

There is a choice of enclosure:

The small and economical

flexibility for custom cabinet sizes, including such Digital standards as the 42-inch H9642-style cabinet. It provides a 9-slot backplane, with 5-slot capacity for additional device and expansion options. The upgrade package requires only 120 watts of the 400 watts of available DC power. In addition, an extended battery backup is optionally available.

The large 10.5-inch enclosure maximises expansion-slot capacity. This variation is available with 2 or 4MB of memory. It offers memory

PMI memory modules.

The 10.5-inch enclosure is also designed around a 9-slot CPU backplane that includes five slots for system option expansion. Further, the 9-slot backplane can be extended up to 27 module slots with the optional DD11-DK and DD11-CK expansion backplanes. An extended battery backup is optionally available.

The new PDP-11/84 10.5-inch enclosure lets you add many new options to your existing system.

Most PDP-11/44 system

PDP-11 MIGRATION

available for expansion. Most PDP-11/24 system configurations have no slots available for expansion in the 5.25-inch enclosure.

The new PDP-11/84 10.5-inch enclosure provides up to 23 slots for additional system expansion. The upgrade can use existing cabinetry and provide maximum expansion capacity for the future.

Other features make the package an even better buy! Included in each package are a floating-point processor for faster processing of compute-bound arithmetic operations, 2MB memory to support the system's increased processing power, a high-speed DMA cache memory for I/O-bound operations and faster memory access for DMA peripherals and interfaces.

With the PDP-11/84 system upgrade, your investment is protected. Most layered software products and peripheral devices run on the PDP-11/84 system upgrade. Provided your present operating system is the latest, supported revision, it too is compatible with the new PDP-11/84 system. The upgrade kits are designed to be compatible with previous PDP-11 UNIBUS designs.

You can choose from a range of UNIBUS-compatible options - memory, disk and tape storage, communications, real-time interfaces - to expand your upgraded system.

With the addition of both internal options and external mass storage, PDP-11/84 enclosure products can be expanded further. Additionally, UNIBUS connections can be extended outside an enclosure with the use of optionally available UNIBUS cable and UNIBUS PDP-11 expansion boxes.



Part No.	Description
11/84-UJ	Any UNIBUS PDP-11 to PDP-11/84E 5.25-inch Upgrade Kit
11/84-UL	Any UNIBUS PDP-11 to PDP-11/84E 10.5-inch Upgrade Kit
11Y84-UN	Any UNIBUS PDP-11 to PDP-11/84E Cabinet Upgrade

Notes:

1. Installation of additional hardware is not included in the upgrade price.
2. The old CPU must be traded in. Contact your Digital sales person for a trade-in value.
3. The operating software licences and layered software licences are the same for the original and the new processor, therefore these software licence upgrades are not required.

The PDP-11/84 Upgrade Kits include:

5.25-inch Enclosure (UJ):

PDP-11/84E Module Set
2MB Memory
5.25-inch System Box
9-slot Processor Backplane
2 System Units (one 9-slot backplane capacity)
5 Slots Available for System Options
650-watt PSU (400 watts DC)
Expandable to Maximum 4MB Memory
Integration/Installation/De-installation by Digital
Hardware Site Audit

10.5-inch Enclosure (UL and UN):

PDP-11/84E Module Set
2MB Memory
10.5-inch System Box
9-slot Processor Backplane
6 System Units (three 9-slot backplane capacity)
5 to 23 Slots Available for System Options
DD11-DK or DD11-CK Compatible
1100-watt PSU (768 watts DC)
H9647 Cabinet (11/84 only)
Expandable to Maximum 4MB Memory
Integration/Installation/De-installation by Digital
Hardware Site Audit

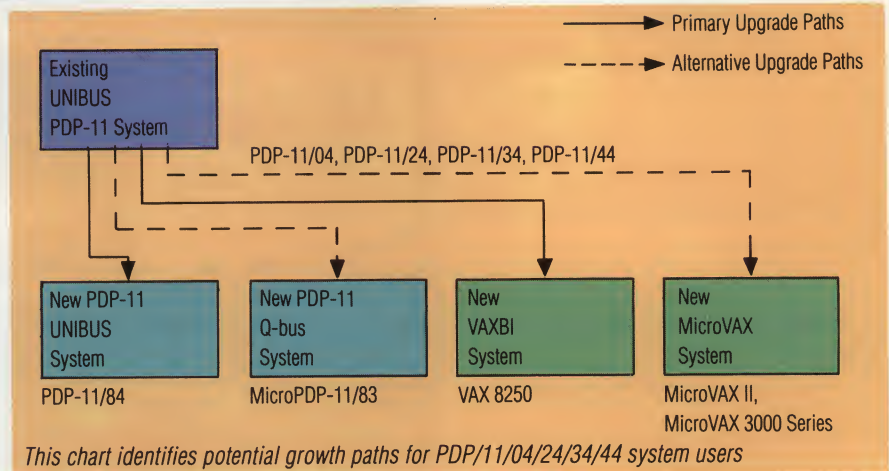
Notes:

1. Special conditions apply to IAS or RT11 system customers. Call your sales representative.
2. The PMI-based memory is designed and supported only on the PDP-11/84. All existing memory on your current PDP-11 system must be replaced with MSV11-J add-on memory.
3. For detailed configuration information and minimum operating system support, please consult the current edition of the PDP-11 Systems and Options Catalogue.

PDP-11 MIGRATION

MULTIPLE GROWTH PATHS FOR PDP-11/04/24/34/44 OWNERS FROM A PDP-11/04/24/34/44 TO A MORE POWERFUL PDP-11

You can gain more power while still protecting hardware and software investments. New technological changes make upgrading to the following systems a cost-effective decision.



Recommended systems

PDP-11/84 System

- ▶ Logical upgrade to high-end member of UNIBUS PDP-11 family
- ▶ Memory capacity up to 4MB
- ▶ Increased CPU performance
- ▶ Increased system expandability
- ▶ Enhanced system reliability

- ▶ Reduced cost of ownership
- ▶ Software compatibility
- ▶ Compatible UNIBUS peripherals/devices allow easy migration

MicroPDP-11/83 System

- ▶ Highest performance 16-bit Q-bus system available

- ▶ Ideal choice where no bus dependencies exist
- ▶ Increasing CPU performance in half the cabinet size
- ▶ Software investment protection
- ▶ Reduced cost of ownership
- ▶ Easy future migration to the MicroVAX II

FROM A PDP-11/04/24/34/44 SYSTEM TO A VAX/VMS SYSTEM

Migration to VAX/VMS is now an economical choice with new MicroVAX and VAXBI entry-level systems. Cost of ownership savings and future expansion potential make VAX/VMS the preferred migration path for many PDP-11 system owners.

Recommended systems

VAX 8250

- ▶ Ideal choice when UNIBUS support requires entry-level system to VAXBI technology
- ▶ Performance equal to 1.2 times that of a VAX-11/780 system
- ▶ Upgradeable to VAX 8350 for more power in the same cabinet
- ▶ Potential to expand into VAXclusters
- ▶ Increased system expandability
- ▶ Extensive availability of software applications

MicroVAX II and MicroVAX 3000 Series

- ▶ Full VAX/VMS software compatibility in compact form
- ▶ Performance equals from 0.9 to 2.7 times that of a VAX-11/780 system
- ▶ Reduced cost of ownership
- ▶ Expandable into Local Area VAXcluster environment
- ▶ Ease of future growth
- ▶ Extensive availability of software applications

PDP-11 MIGRATION

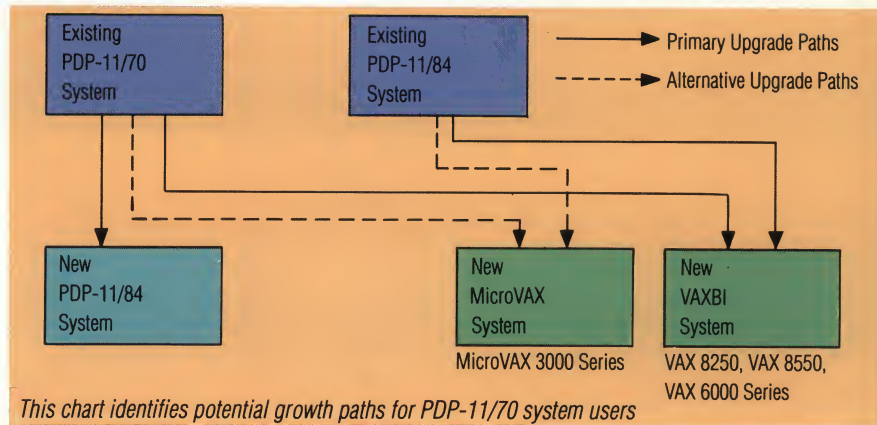
MULTIPLE GROWTH PATHS FOR PDP-11/70 AND 11/84 OWNERS

In 1984, the PDP-11/84 system was introduced as the new high-end member of the PDP-11 UNIBUS family. Many customers have since migrated to it from older and smaller PDP-11 systems and are now seeking greater system power and expandability.

PDP-11/70 TO PDP-11/84

Keeping within the PDP-11 family, you can boost CPU performance and update current technology with a box or cabinet-level replacement.

A system-level upgrade of your PDP-11/70 system is recommended for CPU-bound applications or in those cases where cost of ownership is the key factor.



PDP-11/70 to PDP-11/84:

- Recommended for CPU-bound systems where VAX/VMS is not acceptable
- Cost-of-ownership savings can cover the system purchase price
- Improved compatibility for support and migration
- Common VAX and PDP-11/84 storage devices for two-phase growth

PDP-11/70 and PDP-11/84 TO A VAX/VMS SYSTEM

A popular choice among PDP-11/70 system owners has been VAX/VMS migration - for the richness of a 32-bit computing environment and for the modular growth capabilities inherent

in VAX/VMS.

Now both entry-level VAXBI and mid-range VAXBI systems give you higher price/performance than ever before. If your installation

involves users accessing private data files, Digital provides a family of workstations to increase your productivity.

VAX 8250:

- Most economical entry-level choice to replace small-to medium-sized PDP-11/70 and PDP-11/84 systems where UNIBUS support is required
- Built-in growth plan
- Upgradeable in cabinet to VAX 8350
- Choice of powerful software development environments of VMS or ULTRIX
- Software compatibility across entire VAX/VMS family
- Performance equals 1.2 times that of a VAX-11/780 system

VAX 8550:

- Best choice to replace large PDP-11/70 and PDP-11/84

single-stream performance is important with additional capacity for growth

- Expandable to 246MB of main memory
- Performance equals 6 times that of a VAX-11/780
- Replace multiple PDP-11/70 and PDP-11/84 systems with one VAX 8550 in one 27-inch cabinet
- Software compatibility across entire VAX/VMS family
- Ability to take advantage of VAXcluster technology

VAX 6000-210:

- Entry-level choice for medium-to-large sized PDP-11/70 and PDP-11/84

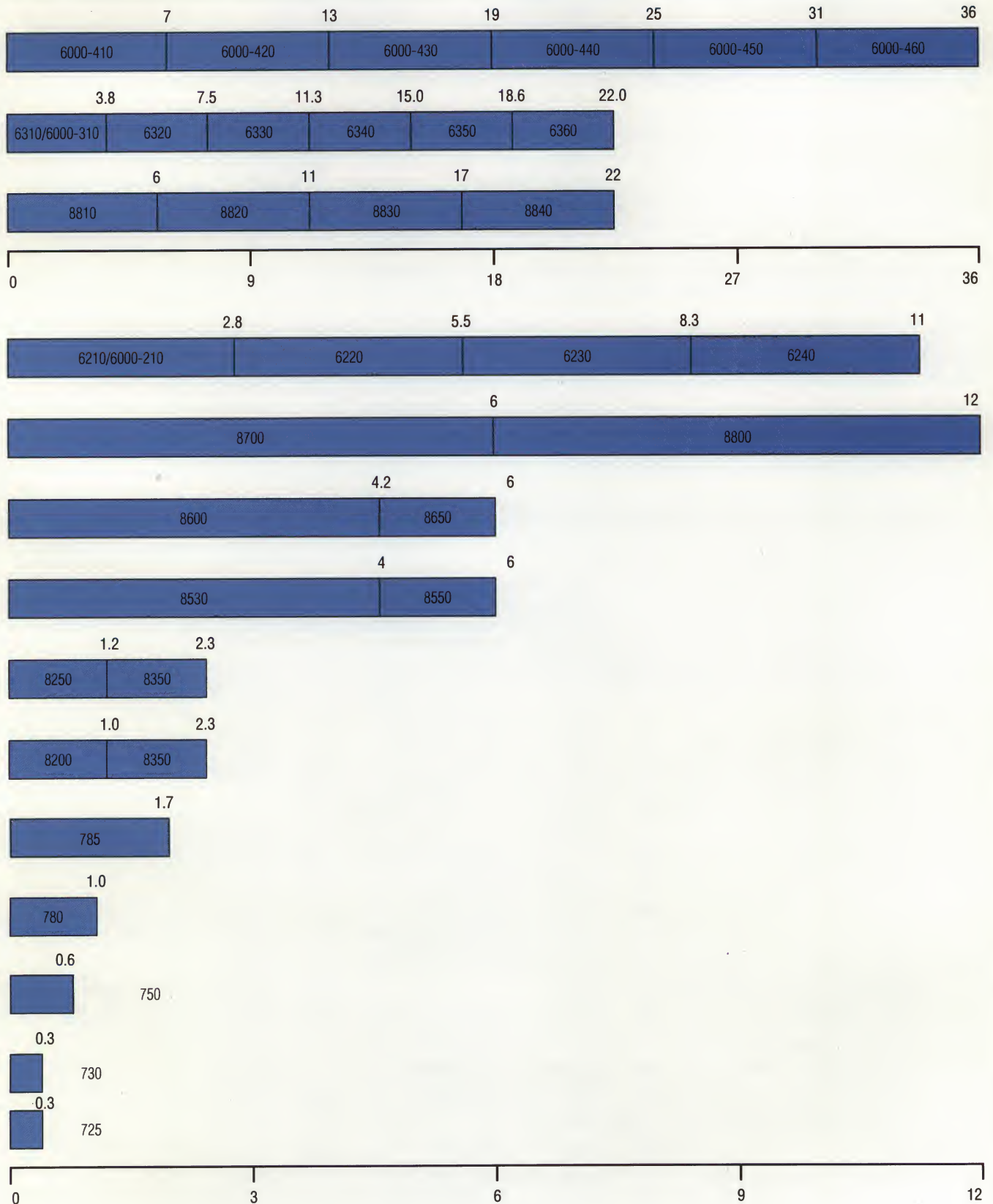
- Performance equals 2.8 times that of a VAX-11/780 system
- Extensive in-cabinet expansion
- Optimum multistream performance

MicroVAX 3000 Series

- Entry-level VAX systems when moving from small PDP-11/70 and PDP-11/84 systems
- Compact office solution
- Performance equals up to 3.8 times that of a VAX-11/780 system
- Supports up to 64MB of memory
- Can be used as a satellite or boot node in a Local Area VAXcluster system

RELATIVE SYSTEM PERFORMANCE

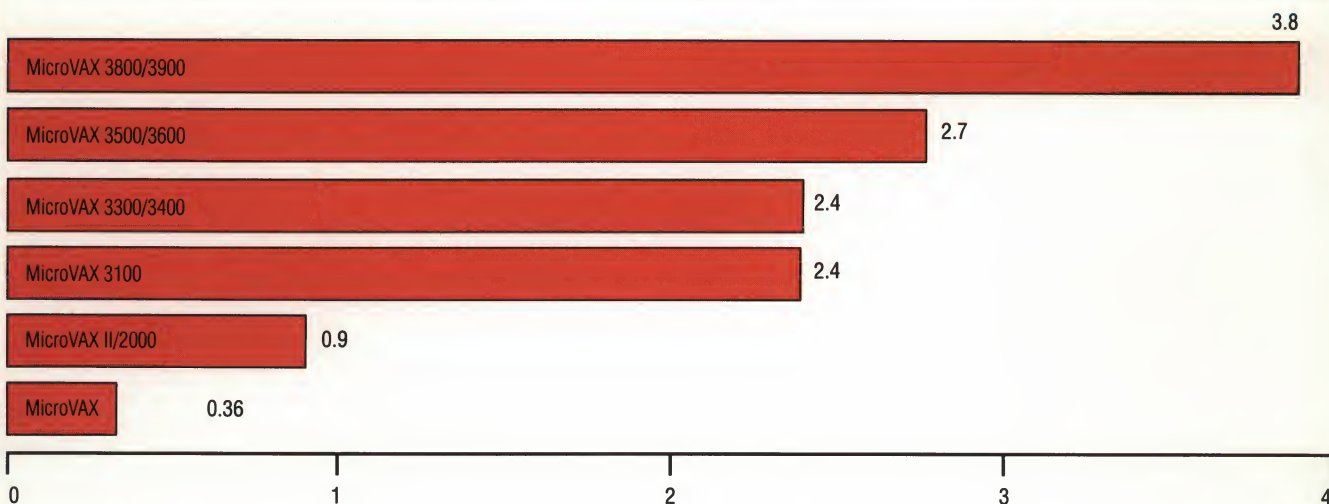
Relative VAX performance chart



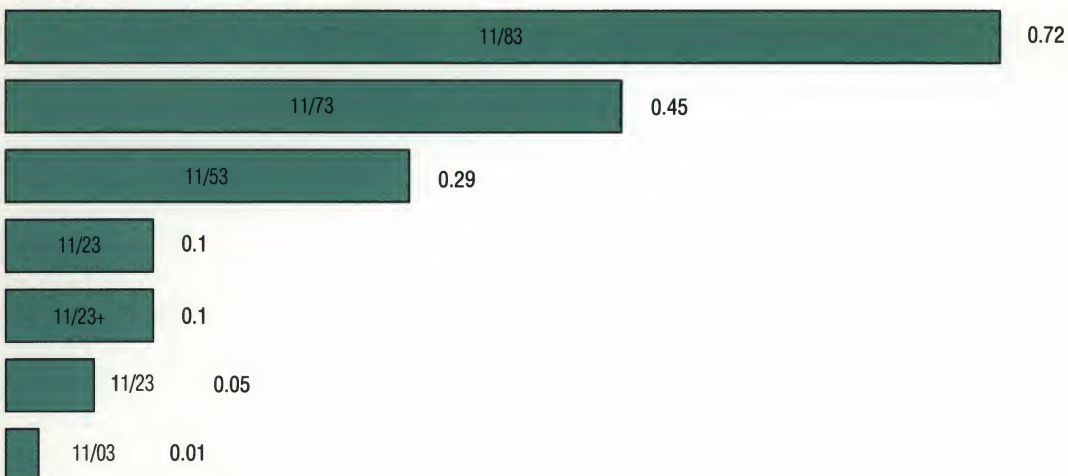
These charts show the relative CPU performance of Digital's VAX, MicroVAX and PDP-11 systems, using the VAX-11/780 as a standard (VAX-11/780 = 1.0).

All performance ratings are application and operating system dependent.

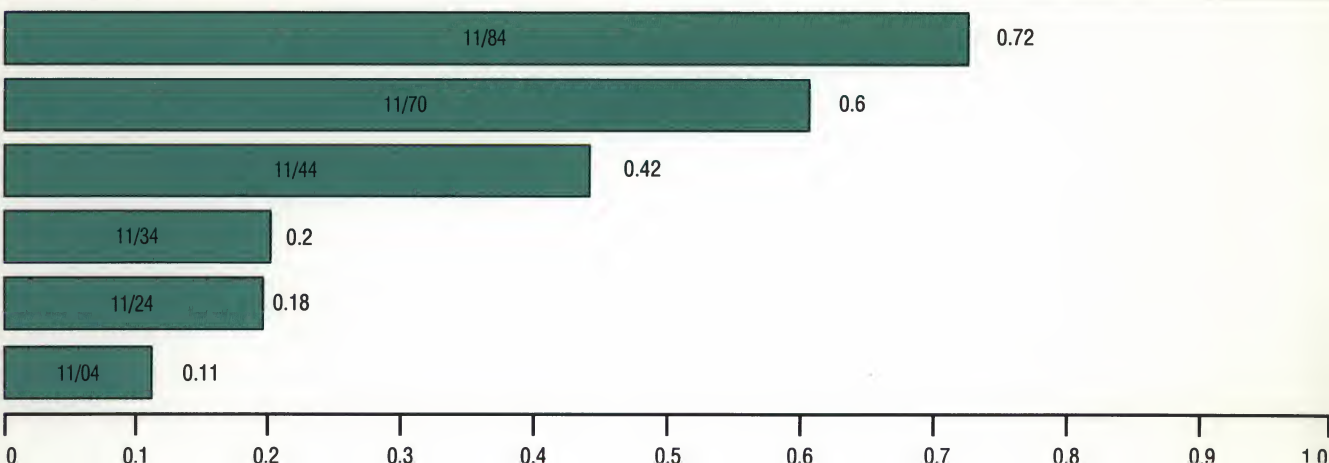
Relative MicroVAX performance chart

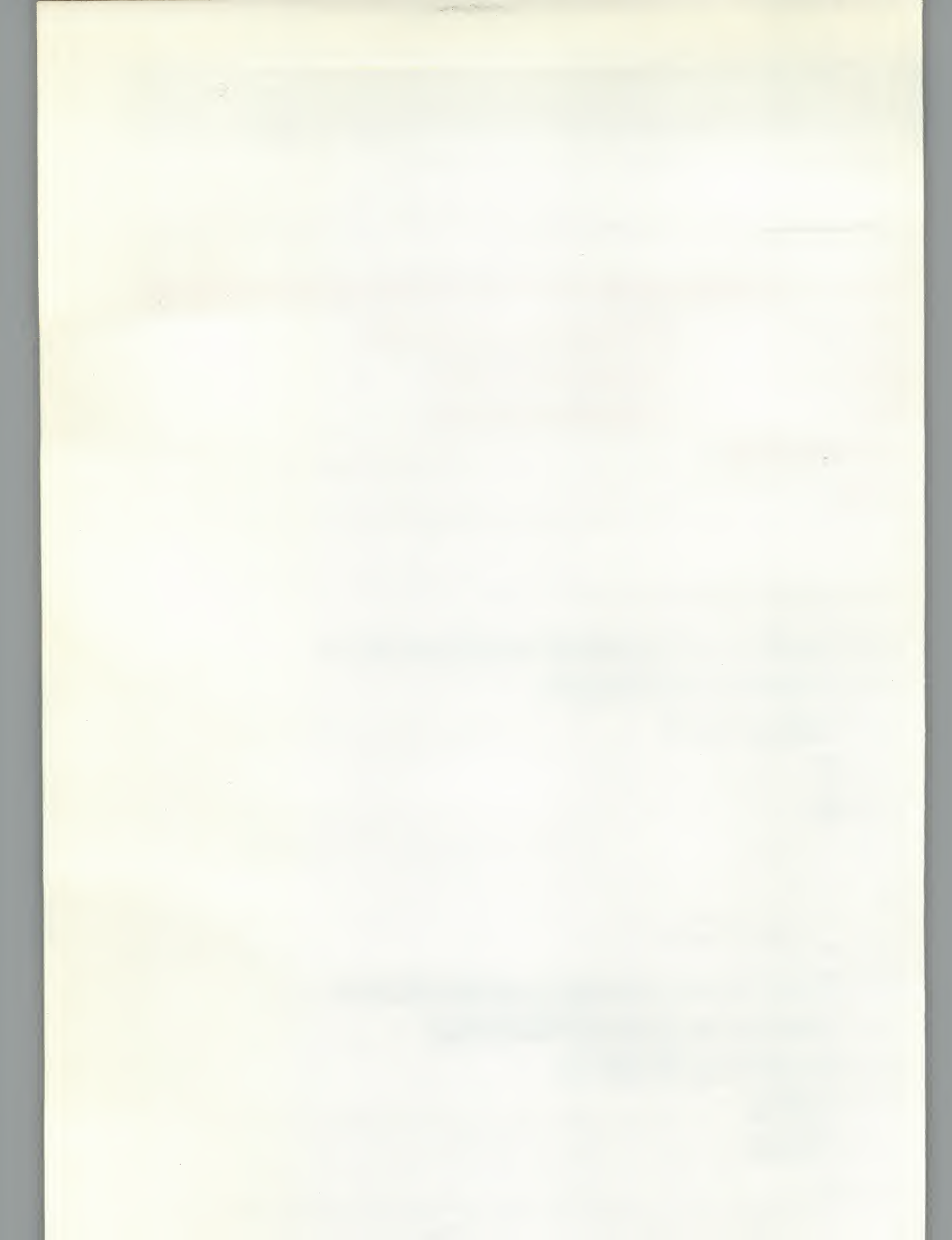


Relative PDP-11 QBUS performance chart



Relative PDP-11 UNIBUS performance chart







Niets uit deze uitgave mag worden vervoelvoudigd en/of openbaar gemaakt door middel van druk, fotokopie, microfilm of op welke wijze ook, zonder voorafgaande toestemming van de uitgever.

Hoewel aan de inhoud van deze publikatie uiterste zorg is besteed, kan voor eventuele fouten, onjuistheden en/of onvolledigheden niet worden ingestaan en aanvaardt Digital deswege geen enkele aansprakelijkheid.

De informatie in deze uitgave kan steeds zonder enige kennisgeving worden gewijzigd.

ALL-IN-1, DEC, Digital-logo, Micro PDP, PRO, Rainbow, ULTRIX, VAX, VAXcluster, VIDA, VMS, VT, WPS en vele combinaties met DEC en VAX als toevoeging zijn geregistreerde handelsmerken van Digital Equipment Corporation.

MS-DOS en OS/2 zijn geregistreerde handelsmerken van Microsoft Corporation. UNIX is een geregistreerd handelsmerk van American Telephone & Telegraph Company. Apple en Macintosh zijn geregistreerde handelsmerken van Apple Computer, Inc. ADA is een geregistreerd handelsmerk van

digital

digital